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TECHNICAL WHITE PAPER 6: CONDITIONS OF COVERAGE FOR THE CITY OF SAN DIEGO VERNAL POOL HABITAT CONSERVATION PLAN

Prepared for:

San Diego Association of Governments Service Bureau
401 B Street, Suite 800
San Diego, CA 92101
Phone: (619) 699-1951

Prepared by:

AECOM
1420 Kettner Boulevard, Suite 500
San Diego, CA 92101
Phone: (619) 233-1454

Primary Authors:
Lindsey Cavallaro and Scott McMillan

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CHAPTER 1
INTRODUCTION

1.1 PROJECT OVERVIEW

The San Diego Association of Governments (SANDAG Service Bureau) will prepare a Vernal Pool Habitat Conservation Plan (VPHCP) for the City of San Diego (City) largely based on information contained in a series of Technical White Papers (TWPs). The Planning Area for the VPHCP is the geographical extent of land that will be included in the VPHCP and for which the protections provided under the VPHCP are afforded to the seven focal species. For the City's VPHCP, these lands include the entire jurisdictional boundaries of the City and three areas owned by the City's Public Utilities Department in the unincorporated portion of San Diego County. The Planning Area's extent is, by design, the area covered by the City's Multiple Species Conservation Program (MSCP); the VPHCP is a separate but compatible conservation plan for vernal pools and seven endangered focal species not covered under the City's MSCP.

Many lands included in the Planning Area are not under the local land use jurisdiction of the City. These lands could include special districts such as school districts, military lands, other federal properties, and state lands. The regulatory requirements of the VPHCP are not applicable to lands not under the land use jurisdiction of the City. If land ownership is transferred and subsequently comes under the City's jurisdiction, or if the owner voluntarily requests inclusion, the VPHCP regulatory requirements will be applied after undergoing the appropriate amendment process, as outlined in the VPHCP.

The TWPs focus on seven target vernal pool species consisting of five plants and two crustaceans:

- Otay Mesa mint (*Pogogyne nudiuscula*)
- San Diego mesa mint (*Pogogyne abramsii*)
- Spreading navarretia (*Navarretia fossalis*)
- San Diego button-celery (*Eryngium aristulatum* var. *parishii*)
- California Orcutt grass (*Orcuttia californica*)
- Riverside fairy shrimp (*Streptocephalus wootoni*)
- San Diego fairy shrimp (*Branchinecta sandiegonensis*)

The TWP topics are as follows:

- TWP 1: Focal Species Status Update in the City of San Diego
- TWP 2: Assessment of Focal Species Conservation
- TWP 3: Development of Adaptive Management Strategy, and TWP 4: Development of Monitoring Strategy (a combined document)
- TWP 5: Cost Evaluation for Implementation of Management and Monitoring
- TWP 6: Recommendations for Conditions of Coverage
- TWP 7: Conservation Analysis
- TWP 8: Preserve Management Funding Mechanisms

This is TWP 6, which recommends conditions of coverage for the seven focal species consistent with the goals and objectives of the VPHCP. It utilizes information, data, and analysis included in the previous TWPs 1 through 4 (AECOM 2012a, b, and c). This document identifies the following:

- A summary of conservation of vernal pools and focal species provided under the proposed VPHCP Preserve and two Preserve alternatives
- A rationale for why coverage is warranted for each focal species under the proposed VPHCP Preserve and two Preserve alternatives, based on quantitative and qualitative data
- Special conditions required for coverage
- Additional requirements or changes necessary for coverage under the proposed VPHCP Preserve and two Preserve alternatives

1.2 OVERVIEW OF PROPOSED VPHCP PRESERVE AND ALTERNATIVES

The proposed VPHCP Preserve (the Project) would conserve lands subject to City jurisdiction and include 2,183 vernal pools within a total of 53 vernal pool complexes.[1] There are two alternative Preserve boundaries. Alternative 1 (Baseline) would conserve fewer vernal pools than the Project and include 1,644 vernal pools within a total of 46 complexes in the Preserve. Alternative 2 (Expanded Conservation) would conserve 35 more pools than the Project, generally located on Del Mar Mesa and Otay Mesa, and include a total of 2,218 vernal pools

[1] Vernal pool complexes may include two to several hundred individual vernal pools (Keeler-Wolf et al. 1998). Typically, the pools in a complex are connected through the landscape, including the supporting watershed and upland habitats. These vernal pool complexes were given identification numbers by Bauder (1986). The numbers were updated by the City of San Diego's Vernal Pool Inventory (2004) and again updated by SANDAG Service Bureau (2011).

within the same 53 complexes as the Project. TWP 2 (AECOM 2012b) provides more detail on the Project and two alternatives.

1.3 AREA OF ANALYSIS FOR COVERAGE DETERMINATION

There are 10,668 known vernal pools within the overall VPHCP Planning Area. This includes 7,531 vernal pools on Marine Corps Air Station (MCAS) Miramar[2]. This VPHCP process addresses lands subject to the City's jurisdiction that are both inside and outside of the VPHCP Preserve, as well as lands outside the City's jurisdiction that are both inside and outside of the VPHCP Preserve. The VPHCP does not address the 7,531 pools on MCAS Miramar, as the vernal pool data is confidential. The rationale for coverage for the VPHCP Preserve is evaluated based on the conservation of focal species within lands subject to City jurisdiction only.

As shown in Table 1-1, the lands subject to City jurisdiction (highlighted in grey in the table) include 2,329 vernal pools that are subject to the City's jurisdiction. The analysis evaluates conservation for the Project and the two alternatives based on those 2,329 pools and associated seven focal species. It should be noted that existing conserved lands are also located within the VPHCP Preserve that are not subject to City jurisdiction (Item D in Table 1-1). These lands are not addressed in this conservation analysis because the City's land use jurisdiction does not apply to these areas; therefore, the lands cannot be made subject to the requirements of the VPHCP.

For lands subject to City jurisdiction outside the VPHCP Preserve (which would be lost to development), avoidance and minimization of impacts to the vernal pool and focal species are not required. It is assumed that all vernal pools and associated focal species lost to development on City lands outside the Preserve will be mitigated appropriately, as determined by the resource agencies. Therefore, the conditions of coverage apply to vernal pools and focal species on lands subject to City jurisdiction within the VPHCP Preserve only.

[2] Refer to the MCAS Miramar Integrated Natural Resources Management Plan (INRMP) 2011-2015 (Gene Stout and Associates et al.) at http://www.marines.mil/unit/mcasmiramar/ems/Pages/NaturalResources.aspx. Basins include vernal pools as well as other features, such as marsh, puddles, impoundments, ditches, ruts, excavation, building foundation, and watercourse, all of which are considered vernal pool habitat and could contain focal species. Refer to p. 4-10 and 4-11 and Table 4.3.3. of the INRMP.

Table 1-1
Number of Vernal Pools within City's VPHCP Planning Area and Area of Analysis for Coverage Consideration

City Jurisdiction and Preserve Status	Number Of Pools		
VPHCP Planning Area (Total of A through E)	**10,668**		
A. MCAS Miramar (data confidential)	7,531		
	Project	**Alt 1**	**Alt 2**
VPHCP Preserve (B + D)	2,861	2,201	2,898
B. Inside Preserve, Not Subject to City's Jurisdiction	678	557	680
C. Outside Preserve, Not Subject to City's Jurisdiction	130	251	128
D. Inside Preserve, Subject to City's Jurisdiction*	2,183	1,644	2,218
E. Outside Preserve, Subject to City's Jurisdiction*	146	685	111
Pools Subject to City Jurisdiction in Conservation Analysis (D + E)	**2,329**	**2,329**	**2,329**

* The rows shaded in grey indicate the pools subject to City jurisdiction. These categories total 2,329 pools, which are included in the conservation analysis in TWP 2 and evaluated for coverage in TWP 6.

1.4 FOCAL SPECIES DATA OVERVIEW

The conservation analysis is based on the best available data. Distributional information for the focal plant species within the City of San Diego is generally accurate and should be considered complete for purposes of this conservation analysis. The potential for finding additional pools with focal plant species within the City of San Diego is considered low. In comparison, the distributional information for the fairy shrimp species is not nearly as accurate and complete for many of the complexes in the City of San Diego. For some sites, where development has been proposed and extensive surveys have been conducted (such as the J 13 and J 34 complexes), existing data for shrimp species is relatively accurate. On other sites, surveys for fairy shrimp (protocol or otherwise) have not occurred or data is much more incomplete. For example, Otay Lakes (K 5) has well over 75 pools and none have been surveyed adequately; therefore, they are not considered to be occupied by fairy shrimp. However, AECOM's experience with qualitative monitoring of these unsurveyed sites suggests that fairy shrimp occurrence in those complexes is more common than existing data implies. For example, at Proctor Valley (R 1), the City's Vernal Pool Inventory (City of San Diego 2004) listed eight pools occupied by unknown *Branchinecta* species. In 2011, AECOM's protocol surveys identified three pools occupied by San Diego fairy shrimp, and 10 pools occupied by unknown *Branchinecta* species, for a total of 13 occupied pools. Thus, AECOM's protocol surveys identified five additional occupied pools, which is over 62% more pools than identified in the City's Vernal Pool Inventory. Similarly, at Carmel Mountain (H 38), protocol surveys performed by others in 2011 identified two pools occupied by San Diego fairy shrimp and nine pools occupied by unknown *Branchinecta* species, compared to the City's Vernal Pool Inventory data, which only included eight pools occupied by unknown

Branchinecta (over 37% more pools). Further, seasonal variability in ponding as a result of varying rainfall amounts and patterns can affect shrimp occupancy in vernal pools from year to year (Bauder 2005; Simovich and Ripley 2008). This variability can result in substantial differences in fairy shrimp occupancy data at a site between years. Protocol surveys performed by RECON in 1997/1998 on MCB Camp Pendleton identified 216 pools on the bases as occupied by fairy shrimp (RECON 1998). Basewide protocol surveys in 2005 identified 279 occupied pools (USFWS 2008), and 29% increase in observed occupancy. AECOM's experience conducting multi-year protocol fairy shrimp surveys at sites such as MCAS Miramar, Marine Corps Base (MCB) Camp Pendleton, and Otay Mesa further substantiates seasonal variability in fairy shrimp occupancy data (note that site-specific data is confidential).

These examples, as well as qualitative assessments and general observations, suggest the possibility that many additional Riverside and San Diego fairy shrimp occurrences are possible in the City of San Diego. The fact that distributional data for fairy shrimp is likely incomplete must be taken into account when considering the coverage provided under the VPHCP. It is possible that more pools with focal fairy shrimp may be lost or conserved within the VPHCP Preserve than currently estimated.

It is also important to note that the City does not have jurisdiction over the entire distributional ranges for any of the seven focal species, and, therefore, does not have responsibility to protect the entire range of any species. For example, five of the seven VPHCP focal species occur on MCAS Miramar (Otay Mesa mint and Riverside fairy shrimp do not occur on MCAS Miramar), which has 7,531 pools (Table 1-2). Four of the focal species (spreading navarretia, San Diego button-celery, San Diego fairy shrimp, and Riverside fairy shrimp) are known to occur in many of the 2,300 pools on MCB Camp Pendleton (specific data is confidential) and elsewhere (Ramona, San Marcos, Chula Vista, Santa Rosa Plateau, Hemet, Skunk Hollow, and Baja California).

Table 1-2
MCAS Miramar Vernal Pools Occupied by the VPHCP Focal Species

Total Number of Pools	Number of Vernal Pools Occupied by Focal Species				
	POAB	ERAR	NAFO	ORCA	SDFS
7,531	1,112	1,795	6	2	4,051

Source: SANDAG 2011
POAB = San Diego mesa mint
ERAR = San Diego button-celery
NAFO = Spreading navarretia
ORCA = California Orcutt grass
SDFS = San Diego fairy shrimp

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CHAPTER 2
RATIONALE AND CONDITIONS FOR COVERAGE

This chapter identifies the criteria for determination of coverage for each of the seven focal species. Based on these criteria, coverage for each of the seven VPHCP focal species populations within the proposed Project and two alternative Preserve boundaries is evaluated. This evaluation is based on the information, data, and analysis contained in the previous TWPs 1 through 4 (AECOM 2012a, b, and c). The vernal pools that are subject to this evaluation are those within the City's jurisdiction, both inside and outside the Preserve, as described in Section 1.3.

2.1 COVERAGE CRITERIA

The three criteria that must be met to consider each focal species covered under the VPHCP are as follows:

1. All complexes occupied with the focal species are conserved at some level (75%, 94%, or 100% conservation level),
2. All complexes identified in the U.S. Fish and Wildlife Service (USFWS) Recovery Plan (1998) as necessary to stabilize the focal species populations are conserved at some level (75%, 94%, or 100% conservation level), and
3. The majority of the focal species population genetics within any given complex is conserved (i.e., at least 50% of occupied vernal pools within a complex are conserved at some level).

2.2 COMPARISON OF ALTERNATIVES

The Project and two alternatives were analyzed in detail in TWP 2 (AECOM 2012b). Table 2-1 summarizes the analysis from TWP 2, including the vernal pool and focal species conservation provided by each of the three alternatives, as well as the percentage of focal species populations conserved. Table 2-2 summarizes the acres of critical habitat conserved under each alternative.

Table 2-1
Summary of Vernal Pool and Focal Species Conservation within the VPHCP Preserve by Alternative

Alternative	Number of Pools in Planning Area Subject to City's Jurisdiction	Number of Complexes within VPHCP Preserve Subject to City's Jurisdiction	Number of Pools within VPHCP Preserve Subject to City's Jurisdiction	Number of Pools Conserved within Preserve Based on Conservation Level*	Number of Pools Lost to Development (Inside and Outside of Preserve) Based on Conservation Level*	Consistent with USFWS Recovery Plan for Stabilizing Focal Species[1]	% Vernal Pools Conserved Based on Conservation Level*	Total Popu1ation Conserved in Planning Area Subject to City's Jurisdiction (%)*						
								PONU	POAB	NAFO	ERAR	ORCA	RFS	SDFS
Project	2,329	53	2,183	2,109	220	Yes	90.6	100	96.9	98.9	99.0	100	99.1	87.9
Alternative 1 – Baseline	2,329	46	1,644	1,621	708	No	69.6	100	79.0	98.9	93.7	100	96.0	79.2
Alternative 2 – Expanded Conservation	2,329	53	2,218	2,133	196	Yes	91.6	100	96.9	98.9	99.3	100	99.1	88.3

* Pools and species population conserved is based on 75%, 94%, and/or 100% conservation level by vernal pool complex. See TWP 2 for more detail on the conservation analysis.
[1] Conserves the complexes identified in Appendix F of the USFWS Recovery Plan (1998) as "necessary to stabilize" the focal species.

PONU = Otay Mesa mint
POAB = San Diego mesa mint
NAFO = Spreading navarretia
ERAR = San Diego button-celery
ORCA = California Orcutt grass
RFS = Riverside fairy shrimp
SDFS = San Diego fairy shrimp

Table 2-2
Summary of Critical Habitat Conservation within Planning Area by Alternative

	NAFO Critical Habitat Acres	Proposed RFS Critical Habitat Acres	SDFS Critical Habitat Acres
Total Critical Habitat Acres in Planning Area	624	847	1,834
Critical Habitat Conserved by Alternative[1]	**Total Acres Conserved and % of Acres Conserved in Planning Area**		
Project	575 (92.3%)	777 (91.8%)	1,475 (80.4%)
Alternative 1 – Baseline	517 (82.9%)	724 (85.5%)	1,287 (70.1%)
Alternative 2 – Expanded Conservation	597 (95.7%)	784 (92.6%)	1,613 (87.9%)

[1] Based conservation level (75%, 94%, or 100%); refer to TWP 2 (AECOM 2012b) for more detail.
NAFO = Spreading navarretia
RFS = Riverside fairy shrimp
SDFS = San Diego fairy shrimp

Overall, Alternative 2 (Expanded Conservation) would provide the most coverage for both vernal pools (91.6% conserved) and individual focal species. The Project would provide only slightly less coverage for vernal pools (90.6% conserved) compared to Alternative 2, with 24 (1%) fewer vernal pools conserved. Alternative 1 (Baseline) would provide the least amount of coverage for vernal pools (69.6% conserved), with 488 (21.0%) and 512 (22.0%) fewer conserved pools than the proposed Project and Alternative 2, respectively.

With regard to the seven focal species, all three alternatives would provide the same percentage of conservation for Otay Mesa mint (100%), spreading navarretia (98.9%), and California Orcutt grass (100.0%) populations within the Preserve on lands subject to City jurisdiction (Table 2-1). The proposed Project and Alternative 2 would provide the same percentage of conservation for San Diego mesa mint (96.9%) and Riverside fairy shrimp (99.1%), and nearly the same percentage of conservation for San Diego button-celery (99.0% vs. 99.3%) and San Diego fairy shrimp (87.9% vs. 88.3%). Alternative 1 would provide a lower percentage of conservation for these four species compared to both the Project and Alternative 2.

As summarized in Table 2-1, both the Project and Alternative 2 provide conservation of the complexes identified in the USFWS Recovery Plan as important to stabilize each of the focal species populations. Therefore, they are considered consistent with the USFWS Recovery Plan. Alternative 1 (Baseline) is not consistent because it does not conserve all of the complexes identified in the USFWS Recovery Plan. More detail regarding consistency with the USFWS Recovery Plan is provided in Tables 2-3 through 2-5.

Table 2-2 shows the total acres of critical habitat for each applicable species conserved within each alternative (based on conservation level), as well as the percentage of critical habitat acres conserved within the overall VPHCP planning area. Alternative 2 provides the most conservation of critical habitat for the three applicable focal species (spreading navarretia, Riverside fairy shrimp, and San Diego fairy shrimp). The Project conserves slightly less critical habitat for spreading navarretia and Riverside fairy shrimp compared to Alternative 2, and approximately 138 fewer acres of San Diego fairy shrimp critical habitat (7.5% less). Alternative 1 provides the least conservation of critical habitat. While conservation of focal species' critical habitat is not a criterion for coverage in this TWP, this information is provided for consideration during the City's VPHCP development process.

2.3 FOCAL SPECIES COVERAGE DETERMINATION

This section provides the rationale and conditions of coverage for the Project and two alternatives. The following information is provided for each focal species under the Project (Table 2-3), Alternative 1 – Baseline (Table 2-4), and Alternative 2 – Expanded Conservation (Table 2-5):

- Percentage of population conserved within and outside of the VPHCP Preserve (on lands subject to City jurisdiction)
- Percentage of population within and outside of the VPHCP Preserve that will be lost to development (on lands subject to City jurisdiction),
- Coverage determination for VPHCP Preserve
- Rationale for considering a species covered (or not covered) under the VPHCP (based on the criteria identified in Section 2.1)
- Conditions for coverage and/or additional requirements to obtain coverage
- Coverage determination based on VPHCP conditions

For each species, rationale is provided for the determination of coverage under each alternative within the VPHCP Preserve (Tables 2-3, 2-4, and 2-5). In some cases where the coverage criteria are not met for a focal species, special additional conditions are necessary for coverage. Note that consistency with Coverage Criteria 1 and 2 is dictated by the Preserve boundaries. Under this analysis, it is not an option to modify the Preserve boundaries for the alternatives; therefore, conditional coverage is not possible for Persevere alternatives that do not meet Coverage Criteria 1 and 2. Conditional coverage is only possible for specific complexes occupied by focal species

that do not meet Coverage Criterion 3 in the form of onsite mitigation to conserve focal species genetics.

In summary, five of the seven focal species would be considered covered under the VPHCP for both the Project and Alternative 2 based on the conservation provided by the Preserve boundary. San Diego button-celery and San Diego fairy shrimp would not be considered covered under the Project and Alternative 2 because Coverage Criterion 3 (Section 2.1) would not be met for these species (refer to Tables 2-3 and 2-5 for detail). Therefore, special conditions have been developed so that Coverage Criterion 3 would be met for San Diego button-celery and San Diego fairy shrimp. These special conditions (in the form of mitigation) would be requirements of the VPHCP. With the additional coverage conditions, the VPHCP would provide coverage for all seven focal species under the Project and Alternative 2.

Alternative 1 (Table 2-4) would not provide coverage for any of the focal species except California Orcutt grass. Coverage Criteria 1 and/or 2 are not met for the other six focal species. Therefore, conditional coverage is not possible for those species (as explained above).

Table 2-3
Rationale and Conditions for Coverage for Focal Species under the City of San Diego VPHCP – Project

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Plant Species						
Otay Mesa mint (*Pogogyne nudiuscula*)	100% (368 out of 368 occupied pools)	0% (0 out of 368 occupied pools)	**Criterion 1: Yes** All complexes occupied with Otay Mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Otay Mesa mint would be conserved at some level. **Criterion 3: Yes** The entire known population of Otay Mesa mint within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the Otay Mesa mint population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Otay Mesa mint is maintained in perpetuity.	Yes
San Diego mesa mint (*Pogogyne abramsii*)	97% (271 out of 280 occupied pools)	3% (9 out of 280 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego Mesa mint would be conserved at some level.	Yes	Conditions of Coverage: • Development of complexes with a 75% (U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation level that contain pools with San Diego	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			Criterion 3: Yes No vernal pools with this focal species would be completely lost (i.e., 0% conserved). Some pools occur within a 75% (U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation-level area, which would result in a potential 3% (approximate) loss of the population within the VPHCP planning area under the City's jurisdiction. However, at least 50% of the occupied pools would be conserved at each of these complexes. Therefore, the genetics would be conserved.		Mesa mint must avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the San Diego mint population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego Mesa mint is maintained in perpetuity.	
Spreading navarretia (*Navarretia fossalis*)	99% (94 out of 95 occupied pools)	1% (1 out of 95 occupied pools)	**Criterion 1: Yes** All complexes occupied with spreading navarretia would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize spreading navarretia would be conserved at some level.	Yes	<u>Conditions of Coverage:</u> • Mitigation is necessary for the loss of the one pool with spreading navarretia at J 13 N. General mitigation conditions are detailed in Section 2.4. • Of the spreading navarretia	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			Criterion 3: Yes One pool with spreading navarretia at J 13 N (NDU 1 & 2) would be lost. One other pool in the J 13 N complex containing spreading navarretia (at South Otay 1 acre – City) would be conserved; therefore, 50% of the local genetics at this complex would be conserved.		population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of spreading navarretia is maintained in perpetuity.	
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	99% (602 out of 608 occupied pools)	1% (6 out of 608 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego button-celery would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego button-celery would be conserved at some level. **Criterion 3: No** Four pools occupied with San Diego button-celery occur within a 75% conservation-level area (two at H 1-10, 13-15, 18-26 Del Mar Mesa Private, and two at U 19 Cubic), which would result in some potential loss of the population. Five pools with this focal species would be completely lost (i.e., 0% conserved)	No	<u>Additional Requirements for Coverage:</u> • For San Diego button-celery to be covered under the Project, the local genetics at complexes J 13 E, J 13 N, and J 35 would need to be conserved via onsite restoration (using salvaged genetic material) of one additional pool with San Diego button-celery at each of these sites. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			at the following complexes: one pool each at J 13 E, J 13 S, and J 35, and two pools at J 13 N. The local genetics would not be conserved at J 13 E (one out of two pools would be lost), J 13 N (two out of three pools would be lost), and J 35 (the only occupied pool would be lost) because more than 50% of the pools with San Diego button-celery would be lost at each complex unless subsequent surveys or additional conservation determines that more than 50% of the pools with this focal species is conserved.		inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex). - Final success criteria must be developed such that at the end of 5 years, the translocated population size is equal to or greater than the population size prior to development. <u>Conditions of Coverage:</u> • Development of complexes with a 75% conservation level that contain pools with San Diego button-celery (H 1-10, 13-15, 18-26, Del Mar Mesa Private, and U 19 Cubic) must avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the San Diego button-	

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					celery population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego button-celery is maintained in perpetuity.	
California Orcutt grass (*Orcuttia californica*)	100% (58 out of 58 occupied pools)	0% (0 out of 58 occupied pools)	**Criterion 1: Yes** All complexes occupied with California Orcutt grass would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize California Orcutt grass would be conserved at some level. **Criterion 3: Yes** The entire known population of California Orcutt grass within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the California Orcutt grass population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of California Orcutt grass is maintained in perpetuity.	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Fairy Shrimp Species						
Riverside fairy shrimp (*Streptocephalus wootoni*)	99% (131 out of 132 occupied pools)	1% (1 out of 132 occupied pools)	**Criterion 1: Yes** All complexes occupied with Riverside fairy shrimp would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Riverside fairy shrimp would be conserved at some level. **Criterion 3: Yes** Only one pool at J 34 (Candlelight) would be lost (0% conserved). However, the other pool containing Riverside fairy shrimp at J 34 (Candlelight) would be conserved; therefore, 50% of the local genetics would be conserved at that complex.	Yes	Conditions of Coverage: • Mitigation is necessary for the loss of the pool with this focal species at J 34. General mitigation conditions are detailed in Section 2.4. • Of the Riverside fairy shrimp population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Riverside fairy shrimp is maintained in perpetuity.	Yes
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	88% (432 out of 491 occupied pools)	12% (59 out of 491 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego fairy shrimp would be conserved at some level.	No	Additional Requirements for Coverage: • To be covered under the	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			Criterion 2: Yes All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego fairy shrimp would be conserved at some level.		Project, the local genetics of San Diego fairy shrimp at complexes I 12, J 13 N, J 13 S, J 34, and J 35 would need to be conserved via onsite restoration using salvaged local genetics. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex). - Final success criteria must be developed such that at the end of 5 years, the translocated population size is equal to or greater than the population size prior to	
			Criterion 3: No Some pools with San Diego fairy shrimp are within a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation-level area. Some pools with San Diego fairy shrimp would be completely lost (0% conserved) occurring in complexes I 12 (four pools), J 13 N (13 pools), J 13 S (two pools), J 34 (16 pools), J 35 (three pools), N 5-6 (seven pools), and Q 3 (four pools). Less than 50% of the pools with San Diego fairy shrimp would be conserved at I 12 (four out of six pools), J 13 N (13 out of 13 pools), J 13 S (two out of two pools), J 34 (16 out of 16 pools), and J 35 (three out of three pools), unless subsequent surveys or additional conservation determines that more than 50% of the pools with this focal species is conserved.			

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					development. <u>Conditions of Coverage:</u> • Development of complexes with a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation level that contain pools with San Diego fairy shrimp must avoid or mitigate for loss those pools. General mitigation conditions are detailed in Section 2.4. • Of the San Diego fairy shrimp population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego fairy shrimp is maintained in perpetuity.	

VPHCP = City of San Diego Vernal Pool Habitat Conservation Plan
[1] Detailed data analysis is provided in TWP 2 (AECOM 2012b).

Table 2-4
Rationale and Conditions for Coverage for Focal Species under the City of San Diego VPHCP – Alternative 1 (Baseline)

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Plant Species						
Otay Mesa mint (*Pogogyne nudiuscula*)	100% (386 out of 386 occupied pools)	0% (0 out of 386 occupied pools)	**Criterion 1: Yes** All complexes occupied with Otay Mesa mint would be conserved at some level.	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for Otay Mesa mint because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No
			Criterion 2: No Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize Otay Mesa mint would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved).			
			Criterion 3: Yes The entire known population of Otay Mesa mint within the area subject to the City's jurisdiction for the VPHCP would be conserved.			
San Diego mesa mint (*Pogogyne abramsii*)	79% (221 out of 280 occupied pools)	21% (59 out of 280 occupied pools)	**Criterion 1: No** Not all complexes occupied with San Diego mesa mint would be conserved. Complexes C 27, I 1, I 6 B, I 6 C, N 1-4, U 15, and U 19 are occupied with San Diego mesa mint and would be 0% conserved.	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for San Diego mesa mint because it does not conserve all occupied complexes. In addition, the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No
			Criterion 2: No Not all complexes identified in the USFWS Recovery Plan as necessary to			

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			stabilize San Diego mesa mint would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: No** Complexes C 27, I 1, I 6 B, I 6 C, N 1-4, U 15, and U 19 are occupied with San Diego mesa mint and would be 0% conserved. Therefore, the local genetics would be completely lost at these complexes.			
Spreading navarretia (*Navarretia fossalis*)	99% (94 out of 95 occupied pools)	1% (1 out of 95 occupied pools)	**Criterion 1: Yes** All complexes occupied with spreading navarretia would be conserved at some level. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize spreading navarretia would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: Yes** One pool with spreading navarretia at J 13 N (NDU 1 & 2) would be lost. One other pool in the J 13 N complex containing spreading navarretia (at South Otay 1 acre – City) would be conserved; therefore, 50% of the local genetics would be conserved.	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for spreading navarretia because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	94% (570 out of 608 occupied pools)	6% (38 out of 608 occupied pools)	**Criterion 1: No** Not all complexes occupied with San Diego button-celery would be conserved, including I 1, I 6 C, and J 13 S (0% conservation). **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego button-celery would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: No** Two pools occupied with San Diego button-celery within a 75% conservation-level area (two at H 1-10, 13-15, 18-26 Del Mar Mesa Private) would result in some potential loss of the population. A total of 38 pools with San Diego button-celery would be completely lost (i.e., 0% conserved) at the following complexes: six pools at H 1-10, 13-15, 18-26 Rhodes, two pools at H 33, 15 pools at I 1, two pools at I 6 C, one pool at J 13 E, two pools at J 13 N, 7 pools at J 13 S, one pool at J 35, and two pools at U 19. The local genetics would not be conserved at H 33 (two out of two pools lost), I 1 (15 out of 15 pools lost), I 6 C (two out of two pools lost), J 13 E (one out of two pools would be lost), J	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for San Diego button-celery because it does not conserve all occupied complexes. In addition, the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			13 N (two out of three pools would be lost), J 13 S (seven out of seven pools lost), J 35 (the only occupied pool would be lost), and U 19 (two out of two pools lost) because more than 50% of the pools with San Diego button-celery would be lost at each complex.			
California Orcutt grass (*Orcuttia californica*)	100% (58 out of 58 occupied pools)	0% (0 out of 58 occupied pools)	**Criterion 1: Yes** All complexes occupied with California Orcutt grass would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize California Orcutt grass would be conserved at some level. **Criterion 3: Yes** The entire known population of California Orcutt grass within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the California Orcutt grass population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of California Orcutt grass is maintained in perpetuity.	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Fairy Shrimp Species						
Riverside fairy shrimp (*Streptocephalus wootoni*)	96% (127 out of 132 occupied pools)	4% (5 out of 132 occupied pools)	**Criterion 1: Yes** All complexes occupied with Riverside fairy shrimp would be conserved at some level. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize Riverside fairy shrimp would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: No** Both occupied pools at J 34 (Candlelight) would be lost. Therefore, 50% of the local genetics would not be conserved at that complex.	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for Riverside fairy shrimp because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	79% (389 out of 491 occupied pools)	21% (102 out of 491 occupied pools)	**Criterion 1: No** Not all complexes occupied with San Diego fairy shrimp would be conserved. Complexes C 27, F 16-17, I 1, I 6 B, I 6 C, J 13 S, J 20-21, N 1-4, Q 3, U 15, and U 19 would be 0% conserved. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego fairy shrimp would be conserved, including F 16-17, J 13 S, J 20-21, and J 21 (0% conserved).	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for San Diego fairy shrimp because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			Criterion 3: No Less than 50% of the pools with San Diego fairy shrimp would be conserved at I 12 (four out of six pools lost) and J 35 (the only occupied pools would be lost).			

VPHCP = City of San Diego Vernal Pool Habitat Conservation Plan

[1] Refer to Section 1.3 for a description of the area of analysis for coverage within the VPHCP Preserve. Detailed data analysis is provided in TWP 2 (AECOM 2012b).

Table 2-5
Rationale and Conditions for Coverage for Focal Species under the City of San Diego VPHCP – Alternative 2 (Expanded Conservation)

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Plant Species						
Otay Mesa mint (*Pogogyne nudiuscula*)	100% (368 out of 368 occupied pools)	0% (0 out of 368 occupied pools)	**Criterion 1: Yes** All complexes occupied with Otay Mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Otay Mesa mint would be conserved at some level. **Criterion 3: Yes** The entire known population of Otay Mesa mint within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the Otay Mesa mint population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Otay Mesa mint is maintained in perpetuity.	Yes
San Diego mesa mint (*Pogogyne abramsii*)	97% (271 out of 280 occupied pools)	3% (9 out of 280 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego Mesa mint would be conserved at some level.	Yes	Conditions of Coverage: • Development of complexes with a 75% (U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation level that contain pools with San Diego	

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			Criterion 3: Yes No vernal pools with this focal species would be completely lost (i.e., 0% conserved). Some pools occur within a 75% (U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation-level area, which would result in a potential 3% (approximate) loss of the population within the VPHCP planning area under the City's jurisdiction. However, at least 50% of the occupied pools would be conserved at each of these complexes. Therefore, the genetics would be conserved.		Mesa mint must avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the San Diego mint population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego Mesa mint is maintained in perpetuity.	
Spreading navarretia (*Navarretia fossalis*)	99% (94 out of 95 occupied pools)	1% (1 out of 95 occupied pools)	**Criterion 1: Yes** All complexes occupied with spreading navarretia would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize spreading navarretia would be conserved at some level. **Criterion 3: Yes** One pool with spreading navarretia at J 13 N (NDU 1 & 2) would be lost. One	Yes	<u>Conditions of Coverage:</u> • Mitigation is necessary for the loss of the one pool with spreading navarretia at J 13 N. General mitigation conditions are detailed in Section 2.4. • Of the spreading navarretia population within the Preserve, 100% conservation must be maintained for coverage.	

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			other pool in the J 13 N complex containing spreading navarretia (at South Otay 1 acre – City) would be conserved in proximity; therefore, 50% of the local genetics at this complex would be conserved.		• The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of spreading navarretia is maintained in perpetuity.	
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	99% (604 out of 608 occupied pools)	1% (4 out of 608 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego button-celery would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego button-celery would be conserved at some level. **Criterion 3: No** Some pools occupied with San Diego button-celery occur within a 75% conservation-level area (H 1-10, 13-15, 18-26 Del Mar Mesa Private, J 13 E, J 13 S, and U 19), which would result in some potential loss of the population. Three pools with this focal species (two in J 13 N [NDU 1 & 2] and one in J 35) would be completely lost (i.e., 0% conserved). The local complex genetics would not be conserved at sites J 13 N (two out of three pools would be lost),	No	<u>Additional Requirements for Coverage:</u> • For San Diego button-celery to be covered under the Project, the local genetics at complexes J 13 N and J 35 would need to be conserved via onsite restoration (using salvaged genetic material) of one pool with San Diego button-celery at each of these sites. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and inoculation program that identifies a specific translocation basin for each basin lost to development.	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			and J 35 (the only occupied pool would be lost) because more than 50% of the pools occupied with San Diego button-celery would be lost, unless subsequent surveys or additional conservation determines that more than 50% of the pools with this focal species is conserved.		Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex). - Final success criteria must be developed such that at the end of 5 years, the translocated population size is equal to or greater than the population size prior to development. <u>Conditions of Coverage:</u> • Development of complexes with a 75% conservation level that contain pools with San Diego button-celery (H 1-10, 13-15, 18-26 Del Mar Mesa Private, and U 19 Cubic) must avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the San Diego button-celery population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan	

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego button-celery is maintained in perpetuity.	
California Orcutt grass (*Orcuttia californica*)	100% (58 out of 58 occupied pools)	0% (0 out of 58 occupied pools)	**Criterion 1: Yes** All complexes occupied with California Orcutt grass would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize California Orcutt grass would be conserved at some level. **Criterion 3: Yes** The entire known population of California Orcutt grass within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the California Orcutt grass population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of California Orcutt grass is maintained in perpetuity.	Yes
Focal Fairy Shrimp Species						
Riverside fairy shrimp (*Streptocephalus wootoni*)	99% (131 out of 132 occupied pools)	1% (1 out of 132 occupied pools)	**Criterion 1: Yes** All complexes occupied with Riverside fairy shrimp would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Riverside fairy shrimp would be	Yes	Conditions of Coverage: • Mitigation is necessary for the loss of the pool with this focal species at J 34. General mitigation conditions are detailed in Section 2.4. • Of the Riverside fairy shrimp population within the	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			conserved at some level. **Criterion 3: Yes** Only one pool at J 34 (Candlelight) would be lost (0% conserved). However, the other pool containing Riverside fairy shrimp at J 34 (Candlelight) would be conserved; therefore, 50% of the local genetics would be conserved at that complex. In addition, mitigation would be required for the lost pool.		Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Riverside fairy shrimp is maintained in perpetuity.	
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	88% (434 out of 491 occupied pools)	12% (57 out of 491 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego fairy shrimp would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego fairy shrimp would be conserved at some level. **Criterion 3: No** Some pools with San Diego fairy shrimp are within a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation-level area. Some pools with San Diego fairy shrimp would be completely lost (0% conserved)	No	<u>Additional Requirements for Coverage:</u> • To be covered under the Project, the local genetics of San Diego fairy shrimp at complexes J 13 N, J 13 S, J 34, and J 35 would need to be conserved via onsite restoration using salvaged local genetics. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and inoculation program that identifies a specific	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
			occurring in complexes I 12 (one pool), J 13 N (13 pools), J 13 S (two pools), J 34 (16 pools), J 35 (three pools), N 5-6 (seven pools), and Q 3 (four pools). Less than 50% of the pools with San Diego fairy shrimp would be conserved at J 13 N (13 out of 13 pools), J 13 S (two out of two pools], J 34)16 out of 16 pools), and J 35 (three out of three pools), unless subsequent surveys or additional conservation determines that more than 50% of the pools with this focal species is conserved.		translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex). - Final success criteria must be developed such that at the end of 5 years, the translocated population size is equal to or greater than the population size prior to development. <u>Conditions of Coverage:</u> • Development of complexes with a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation level that contain pools with San Diego fairy shrimp must avoid or mitigate for loss those pools. General mitigation conditions are detailed in Section 2.4. • Of the San Diego fairy shrimp population within the Preserve, 100% conservation	

Species	Population Conserved within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)[1]	Population Lost within Area Subject to City's Jurisdiction (Inside and Outside of Preserve)	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego fairy shrimp is maintained in perpetuity.	

VPHCP = City of San Diego Vernal Pool Habitat Conservation Plan

[1] Refer to Section 1.3 for a description of the area of analysis for coverage within the VPHCP Preserve. Detailed data analysis is provided in TWP 2 (AECOM 2012b).

2.4 GENERAL CONDITIONS FOR MITIGATION

Vernal pools occupied by focal species that may be lost to development within the VPHCP Preserve (i.e., located within at 75% or 94% conservation level area) are required to be mitigated as a condition of coverage (see Tables 2-3 through 2-5). The following are general conditions for mitigation of vernal pools lost within the Preserve.

1) Prepare and implement a 5-year restoration, maintenance, and monitoring plan that includes the following:

- A microtopographic analysis that demonstrates the remaining preserved areas within the complex are capable of providing adequate buffer and remaining watershed for the translocation basins.
- A salvage and translocation plan that collects focal species genetics from the complex through salvage of soil (shrimp cyst) and/or seed and plant material from each pool that will be lost to development.
- A seed collection, bulking, and dispersal program for the focal plant species.
- A cyst inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite.
- If necessary, a topographic reconstruction plan that specifies topographic repairs to damaged basins that are targeted for the translocation effort.
- A weed eradication and control program with strict 5-year success criteria for low weed cover (e.g., less than 10%) in both the upland and vernal pool habitats.
- A detailed monitoring program that tracks restored focal species population health with strict 5-year success criteria for the vernal pools and upland watershed areas. For plants, the monitoring should include cover and density estimates. For the shrimp species, monitoring should include adult population numbers and cyst density estimates.
- Final success criteria must be developed such that at the end of 5 years, habitat conditions must be a quality such that the focal species population can be maintained in perpetuity.

2) Prepare and implement a long-term monitoring and management plan that includes the following:

- The method for protecting the biological resource values in perpetuity (e.g., conservation easement).
- The entity or organization proposed as owner and land manager of the preserve property.
- A description of the frequency and level of management and maintenance, data collection and reporting requirements, and strict long-term success criteria. Habitat conditions must be maintained at a high quality such that the focal species population can be maintained in perpetuity.
- An endowment based on a Property Analysis Record (PAR) or similar long-term cost estimation method to secure ongoing funding for specific perpetual management, maintenance, and monitoring activities identified in the plan.

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CHAPTER 3
REFERENCES

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AECOM. 2012b. Draft Technical White Paper 2: Assessment of Focal Species Conservation for the City of San Diego Vernal Pool Habitat Conservation Plan. In preparation.

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Review of Technical White Paper 6:

Conditions of Coverage for The City of San Diego Vernal Pool Habitat Conservation Plan

Draft version "60218732 Technical White Paper 6_6.13.12" of June 29, 2012

Reviewed 3 August 2012

Dr. Andrew J. Bohonak

Professor of Biology, San Diego State University

submitted 2012

Please respond to the following questions for TWP 6.

1. Page 7, Coverage Criteria. The TWP includes three criteria for determining coverage. Please comment on the reasonableness of each of criterion from a scientific standpoint. Are there missing or other criteria that should be used or considered? In your experience, what have other conservation plans or conservation efforts used judge how much is enough conservation given very high levels of conservation of vernal pools and focal species among alternatives (Table 2-1). In your opinion, is the TWP overly conservative? From a scientific standpoint, how would you set the standard for conservation?

   p. 7: Probably should reiterate what the baseline survey data are for the percentages introduced here.

   Identify what the percentages 75%, 94% and 100% refer to. Is this % of all pools in a complex? % of pools with the focal species in a complex? I have a feeling that this was addressed in a previous TWP.

   The phrase "The majority of the focal species population genetics within any given complex is conserved" doesn't really make sense, technically. Conserving only 50% of population genetic parameter (such as expected heterozygosity for a particular gene, or total number of alleles per locus) would be a devastating loss. Perhaps the goal is to conserve at least 50% of the pools in the complex that contain the covered species? If so, there needs to be a lower threshold. If there are only three pools in a complex contain a species of concern, is it acceptable that only two be "conserved at some level?

   A better approach would be to get census population sizes for all species of concern in all pools. But I realize that this approach may not be feasible in the near future.

   Table 2-1, last columns: " Total Population Conserved … (%)". This header is difficult to understand. Does this mean "For each species, the percentage of pools within the City's jurisdiction in which it occurs that will be conserved" ?

Considering the extensive historical losses that have already taken place, I do not consider the TWP to be overly conservative.

From a scientific perspective, I would assess whether these criteria are *quantitatively* adequate by comparing them with the revised *quantitative* goals of the HCP. I understand that those have been under revision. It is still unclear how they match up with TWP 6. For example, I believe that one HCP goal for SDFS is "For each complex, prevent a 20% decline in the density of the focal shrimp species over 3 years." Is this < 20% decline what is assumed by "stabilize" in coverage criteria #2? Is the 20% decline with reference to the current state, or the population size of the complex after losses that are permissible under the "Project" or "Alternatives"?

The goal I just cited refers to "density", and on p. 34 of TWP 6, a requirement is made for monitoring population size of fairy shrimp (not just presence/absence). Similarly, cover/density is being monitored for plants. And yet none of the 3 coverage criteria goals explicitly addresses population size or density. It is a bit confusing.

2. Criteria 3 states that: The majority of the focal species population genetics within any given complex is conserved (i.e., at least 50% of occupied vernal pools within a complex are conserved at some level.) If one complex does not meet the criterion and therefore mitigation in needed in order to get conditions of coverage. The criterion states that the mitigation needs to occur within the same complex to preserve the genetic diversity of the complex and assure conservation and thus coverage. Are there any studies supports that conservation of 50% of pools in a complex is sufficient to protect vernal pools focal species? Are there studies that indicate the level of genetic diversity within pools, amongst pools and amongst complexes of pools for the focal species or similar taxa? [*Dr. Bohonak – what inference, if any, can be made from your prior work using mitochondrial DNA of the San Diego fairy shrimp?]*

See my answers to the previous question.

To quantitatively answer issue of genetic diversity, the first question to ask is whether all pools within a complex are genetically homogeneous. To my knowledge, this problem has not been studied in any of the listed species using genetic markers with the appropriate level of resolution. However, we should have answers for SDFS within a year or so using microsatellites.

A) If each pool is genetically unique, then loss of any pool is loss of genetic information.

B) If pools within a complex are sufficiently similar (because gene flow within complexes is moderate or high), then we can apply some rules of thumb from population genetics. The goals in this case would be to

1) Within a complex, maintain enough pools with the focal species to hedge against the simultaneous catastrophic loss of all of them. For example, from fire, major human-induced physical disturbance, pollution, flooding.

2) To minimize the erosion of genetic diversity through drift, maintain a complex-level population sizes in the hundreds indefinitely, or better yet, thousands. Keep in mind that the effective population size is usually less than half of the census population size, and sometimes less than 20% of the census population size. If the effective population

size drops from historic levels in the thousands below 100, drift will accelerate. Below 50 would be critical for the effective population size.

3. The TWP uses the "complex" as the baseline for determining conservation. A complex is an arbitrary unit comprised of a number of individual vernal pools. A "series" is a arbitrary unit comprised of a number of complexes. Are there more ecologically based units of conservation that could be used for the purposes of determining if the focal species are covered (e.g., soil series, mesa complexes)?

Complex should not be arbitrarily defined. A complex is a hydrologically connected group of pools. For the covered species, one assumes that pools within a complex are also biologically connected (through dispersal and gene flow) much more than they are to pools in other complexes.

4. The condition of coverage, allows for the translocation of the focal species as a way to preserve the genetic diversity of complexes that do not preserve at least 50% of the complexes pools. Would translocation of the focal species from one pool to another pool within the complex successful conserve the genetic diversity of the complex? From a scientific standpoint, is it necessary that the species must be translocated within the same complex? Are there exceptions to this general guideline that would allow the species from one complex to a nearby complex? In the absence of scientific studies about the genetics of species, in your professional opinion, does the translocation have to occur within the same complex?

Translocation is preferable to loss with no mitigation. Translocation is preferable to loss with mitigation from a haphazardly selected population that is dissimilar genetically and ecologically. If there is very local adaptation, then mitigation success will be highest if the new pool is as close to possible to the poll that was lost (and presumably is similar in terms of hydrology, soil properties, water chemistry, etc. Translocation to other complexes may bring a maladapted set of genotypes into that complex. Exceptions would be if the other complex is similar genetically.

In the absence of genetic studies, my opinion is that translocation be conducted as close to the pool that was lost whenever possible. Considering the amount of money that would be spent on mitigation, one would want to do everything possible to make sure that it is a long term success.

5. J13 series provides a good example for the translocation of species from one complex to another. For instance, the TWP states that if mitigation is required for SDFS on J13N, the mitigation ad transportation of the species could occur on J13S or J13E or J13N—any of these complexes would be okay (all part of same complex—J13). But the TWP indicates that the transportation to a nearby complex, say J12, would not be acceptable because it would not preserve the genetics of the species in the J13 series. Please comment on these statements.

As stated in my previous answer, in the absence of genetic studies, my opinion is that translocation be conducted as close to the pool that was lost whenever possible. A

definitive answer would only be possible with the appropriate genetic and ecological studies.

6. The TWP states that the distributional information for the fairy shrimp species is "not nearly as accurate and complete for many of the complexes in the City of San Diego [as it is for the focal plant species]. Given the stated opinion of the TWP author's that more pools (both proposed for conservation and loss) may exist with fairy shrimp, how does affect your opinion of the conservation of this species as proposed? Is there any meaningful inference that can be made regarding the missing distribution information from past studies (e.g., the variability of the same pool(s) being occupied by fairy shrimp from year to year)?

   The suggestion that more pools with fairy shrimp may exist does not suggest to me that less conservation is warranted, or that the loss of entire complexes is less important.

   There is a tremendous amount of fairy shrimp distribution data in the gray literature (species surveys by consulting firms and academics). Presumably, those data all have been submitted to USFWS at one point or another. Consolidation of all those data into a single electronic source may allow analysis of long term trends, and inferences about lost pools, to generate meaningful estimates of variability that you are referring to. That information in turn would provide guidelines for minimum monitoring and survey requirements. Particularly if the analysis was done in the context of annual precipitation variability.

7. Are there any other or alternative conditions of coverage that should be considered for the proposed focal species?

   If the role of population size is elaborated on in the HCP goals, then population size should provide a fourth coverage criteria for TWP 6.

8. Do you support the conclusion that with the conditions of coverage shown the proposed Project (Table 2-2) and Expanded Conservation Alternative (Table 2-4) will conserve the focal species given the available information? Do you support the conclusion that the Baseline Alternative (Table 2-3) does not conserve the focal species of San Diego fairy shrimp and Eryngium? Please consider and reference the levels of conservation and conditions of coverage identified in the TWP.

   Based on the information that I have access to in these TWPs, those conclusions seem supported.

<u>Additional minor comments</u>

p. 3 " The VPHCP does not address the 7,531 pools on MCAS Miramar, as the vernal pool data is confidential." requires additional explanation.

Would it be easier if Table and Figure numbers began with the TWP chapter number?

The motivation for two alternative Preserve plans is unclear from the TWP. I presume that these were requested by SANDAG and were discussed in a different TWP?

I agree that fairy shrimp protocol surveys are needed across all of the pools. Moreover, attention needs to be paid to the amount and patterns of precipitation in the survey years. At least one wet season survey should be conducted in a year that is wetter than normal. (The Bauder et al. HGM Guidebook suggests > 32 cm at Lindbergh field for the rainfall year would be wetter than normal, in terms of above average ponding.)

The 2nd and 3rd columns of Table 2-3 are redundant.

In Table 2-3, I appreciate the attention placed to salvage and mitigation for the button celery and SDFS.

p. 34 typo " located within at 75% or 94%"

p. 34. The phrase "dispersal program for the focal plant species" requires explanation.

"habitat conditions must be a quality such that the focal species population can be maintained in perpetuity." Be clear somewhere on this page that the most important aspect of "habitat conditions" is a hydroperiod consistent with undisturbed vernal pools in the species' range in southern California.

p. 35. Add "electronic format and storage" to "data collection and reporting"

Comments from Paul Fromer
Technical White Paper (TWP) 6
Draft Recommendations for Conditions of Coverage

Below are my responses to the questions for TWP 6.

- Page 7, Coverage Criteria. The TWP includes three criteria for determining coverage.
    - Please comment on the reasonableness of each of criterion from a scientific standpoint.

Given the information available for the seven focal species, and in particular the historically reduced distribution and fragmentation of habitat available for the species (and the consequent lack of complete information on pre-colonial population distributions genetics), the criteria seem reasonable. More justification and explanation of the 75%, 94% and 100% conservation levels, how they are determined, and how they are applied would be useful in the introduction to TWP 6.

    - Are there missing or other criteria that should be used or considered?

Some measure or relation of the proposed criteria to focal species population viability concerns, even if qualitative in nature, would be more to the point of the ultimate goals and objectives. Also some measure of ecosystem integrity could be useful in guiding future management actions for conserved pools. The development of these types of measures would need to be incorporated as a priority research goal of adaptive monitoring and management program.

    - In your experience, what have other conservation plans or conservation efforts used judge how much is enough conservation, given very high levels of conservation of vernal pools and focal species among alternatives (Table 2-1).

There is a great diversity in the criteria for adequacy of coverage in other HCPs and NCCPs. This is primarily the result of differences in the status of understanding of the population ecology/life history of the species, the current and historic distribution and structure of genetically important populations of the species, and the proportion of the range of the species being addressed.

In species where there is substantial information in each of these areas, sophisticated population or meta-population modeling can be used to establish quantitative, spatially explicit goals for conservation, which can then refined by population genetic modeling to take into consideration the populations' genetic structure in the ultimate conservation design. These conservation designs are generally robust, and where a significant proportion of the focal populations' ranges are included, allow for more flexible planning.

More often, as in the case of San Diego's vernal pools, much of this information is limited, fragmentary, or not available for the focal species. In this instance, other

planning efforts have made use of simpler ecological models, conceptual models, and ultimately the informed opinions of those biologists most informed on the species' biology.

- In your opinion, is the TWP overly conservative?

Taking into consideration the level of information available for vernal pools, and for the seven focal species, the conservation criteria for these species must be relatively conservative. In particular, this conservatism results from the small and fragmented proportion of the likely pre-colonial range of these species in the plan area that remains.

- From a scientific standpoint, how would you set the standard for conservation?

The primary goal for the plan should be the conservation of self-sustaining populations of each focal species (in the sense of meta-populations) and their supporting ecosystem within all of the remaining, discrete ecological units within the plan area (where enough potentially conserved or restored vernal pool habitat remains and can feasibly assembled in an appropriate configuration). As discussed below, the baseline for determining conservation is a complex concept (not to mix terminology), and may need further discussion.

- Criteria 3 states that: The majority of the focal species population genetics within any given complex is conserved (i.e., at least 50% of occupied vernal pools within a complex are conserved at some level.) If one complex does not meet the criterion and therefore mitigation in needed in order to get conditions of coverage. The criterion states that the mitigation needs to occur within the same complex to preserve the genetic diversity of the complex and assure conservation and thus coverage.

  - Are there any studies supports that conservation of 50% of pools in a complex is sufficient to protect vernal pools focal species?

A clearer relationship should be drawn between the criterion of the conservation of 50% of pools in a complex and the viability of the populations of focal species in the pool complex and mesa complex. It is not possible to determine the adequacy of 50% without an understanding of how a reduction of this magnitude would affect the viability of the focal species individual complex, and the role it might have on the viability in the mesa complex.

  - Are there studies that indicate the level of genetic diversity within pools, amongst pools and amongst complexes of pools for the focal species or similar taxa? [*Dr. Bohonak – what inference, if any, can be made from your prior work using mitochondrial DNA of the San Diego fairy shrimp?]*

I will defer to Dr. Bohonak to answer this specifically. See below for a general comment on the genetic structure of populations of focal species.

- The TWP uses the "complex" as the baseline for determining conservation. A complex is an arbitrary unit comprised of a number of individual vernal pools. A "series" is an arbitrary unit comprised of a number of complexes.

    - Are there more ecologically based units of conservation that could be used for the purposes of determining if the focal species are covered (e.g., soil series, mesa complexes)?

    The most natural ecologically based unit of conservation would seem to be meta-populations within mesa complexes, which in pre-colonial times would not have been the fragmented and isolated distributions that remain. In particular, the dispersal mechanisms of the seven focal species (various pollinators and wind/water/bird dispersal) combined with the general mesa/canyon topography of coastal San Diego, could lead to the inference that historical the level of population interaction is related to topography and geography: pools, pool complexes, mesa complexes, adjacent mesa complexes. Existing population genetic structuring may have been affected by the past several hundred years of habitat degradation and fragmentation. There could have been a gradient of genetic characteristics through the range of some of the focal species in the past that has been interrupted by habitat loss and fragmentation. What we see now may only be a relict.

    For the focal species associated with specific soil series (hardpan vs. claypan) these soil series might usefully be superimposed on the mesa complex distribution for conservation consideration.

- The condition of coverage allows for the translocation of the focal species as a way to preserve the genetic diversity of complexes that do not preserve at least 50% of the complexes pools.

    - Would translocation of the focal species from one pool to another pool within the complex successful conserve the genetic diversity of the complex?

    Within complex translocations should conserve the genetic diversity of the complex, if the pool is part of an overall viable population. Another consideration is the long term population viability, which to a large extent results from the population be conserved within an appropriate and viable fully functioning ecological context.

    - From a scientific standpoint, is it necessary that the species must be translocated within the same complex?

    The complete answer to this question depends upon our understanding of current between- and within-population genetic variability in the context of past variability. Of primary concern should be the maintenance of viable populations of the focal species in an ecologically appropriate context, with due consideration of the maintenance of genetic variability. See discussion above.

    - Are there exceptions to this general guideline that would allow the species from one complex to a nearby complex?

See discussion below.

- In the absence of scientific studies about the genetics of species, in your professional opinion, does the translocation have to occur within the same complex?

See discussion below.

- J13 series provides a good example for the translocation of species from one complex to another. For instance, the TWP states that if mitigation is required for SDFS on J13N, the mitigation ad transportation of the species could occur on J13S or J13E or J13N—any of these complexes would be okay (all part of same complex—J13). But the TWP indicates that the transportation to a nearby complex, say J12, would not be acceptable because it would not preserve the genetics of the species in the J13 series.

  - Please comment on these statements.

  I would agree that translocation of SDFS should be appropriate between pools within the J13 series. The issue of translocation between series (J13 and J12 in this example), should be addressed using two considerations. Is there any population genetic information available to inform the evaluation of the potential for loss of diversity if translocation occurs? What is the risk/benefit to maintenance of the population viability of the host population vs. the potential loss of genetic diversity?

  In keeping with the comments above on potential historical distributions of the focal species and the effects of habitat reduction and fragmentation, decisions on translocations necessary for maintenance or increasing species population viability (including mitigation) should be made on the basis of maintaining overall population viability and population diversity by selecting the host:donor relationship in order from pool, pool complex, pool series, mesa series, and then adjacent mesa series.

- The TWP states that the distributional information for the fairy shrimp species is "not nearly as accurate and complete for many of the complexes in the City of San Diego [as it is for the focal plant species].

  - Given the stated opinion of the TWP author's that more pools (both proposed for conservation and loss) may exist with fairy shrimp, how does affect your opinion of the conservation of this species as proposed?

  Even if there are more pools with fairy shrimp exist, it would represent only a fractional increase in the population distribution and configuration. To the extent that additional fairy shrimp populations are identified in pool complexes that contribute to the long-term viability of the species, they will be of benefit the overall conservation effort, but given the reduced range, distribution, and fragmentation of fairy shrimp populations, Their identification would be likely to make a substantial difference in the proposed conservation. If fairy shrimp populations are identified in locations that do not (or cannot be made to) contribute to conservation, they will make little difference.

- Is there any meaningful inference that can be made regarding the missing distribution information from past studies (e.g., the variability of the same pool(s) being occupied by fairy shrimp from year to year)?

  It is clear that the population biology of fairy shrimp is complex, with overlapping generations, varied individual responses to environmental conditions (particularly the amount and pattern of rainfall), and patchy distribution of populations. These factors make it difficult to predict future populations' responses under the current condition of reduced and fragmented population distribution. The missing information does indicate that fairy shrimp also have a complex ecological strategy to cope with environmental unpredictability. Nonetheless, appropriate management of these species will require a conservative approach that takes these uncertainties into consideration, and provides the species with an adequate ecological "buffer" in terms of conservation of an adequate number and area of suitable vernal pool habitat and supporting ecosystem.

- Are there any other or alternative conditions of coverage that should be considered for the proposed focal species?

  As discussed above, the adaptive monitoring and management program should include the development of measures which will allow evaluation of the long term viability of the populations in the managed conservation units. These measures should be based on increased understanding of the biology of the focal species resulting from the monitoring activities. Parallel to this, the program should also develop management oriented measures of vernal pool ecosystem function.

  A specific timeline for development of these measures could be included as part of the implementation program of the HCP.

- Do you support the conclusion that with the conditions of coverage shown the proposed Project (Table 2-2) and Expanded Conservation Alternative (Table 2-4) will conserve the focal species given the available information?

  Within the limits of our knowledge of the focal species biology and the current status of the long-term loss and fragmentation of vernal pool habitat, the conditions of coverage represent a reasonable and pragmatic starting point for conservation. Specifically, the small incremental loss that would result from either of these alternatives should not significantly decrease the viability of vernal pool ecosystems and species in the plan area, and the implementation conservation, mitigation, and adaptive monitoring and management will provide long-term benefits to these systems and decrease the uncertainty in their ultimate viability. Without implementation of the conservation program, the long-term future viability of vernal pool ecosystems is uncertain.

- Do you support the conclusion that the Baseline Alternative (Table 2-3) does not conserve the focal species of San Diego fairy shrimp and Eryngium? Please consider and reference the levels of conservation and conditions of coverage identified in the TWP.

The proposed Project and the Expanded Conservation Alternative are substantially similar in achieving the criteria established for coverage, as well as, the proportion of vernal pool habitat that would be conserved (and therefore, not lost). The incrementally greater loss of vernal pools, vernal pool habitat, and populations of several of the focal species that would occur under the Baseline Alternative would represent a continuation of the long-term trend, and would appear to increase the uncertainty in the long-term viability of these systems.

FINAL DRAFT

TECHNICAL WHITE PAPER 6: CONDITIONS OF COVERAGE FOR THE CITY OF SAN DIEGO VERNAL POOL HABITAT CONSERVATION PLAN

Prepared for:

San Diego Association of Governments Service Bureau
401 B Street, Suite 800
San Diego, CA 92101
Phone: (619) 699-1951

Prepared by:

AECOM
1420 Kettner Boulevard, Suite 500
San Diego, CA 92101
Phone: (619) 233-1454

Primary Authors:
Lindsey Cavallaro and Scott McMillan

Please note that the Technical White Papers are the products of professional consultants hired by SANDAG Service Bureau, and that the City of San Diego and/or Wildlife Agencies may not concur with the recommendations contained in these reports.

August 2012

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CHAPTER 1
INTRODUCTION

1.1 PROJECT OVERVIEW

The San Diego Association of Governments Service Bureau (SANDAG SB) will prepare a Vernal Pool Habitat Conservation Plan (VPHCP) for the City of San Diego (City) largely based on information contained in a series of Technical White Papers (TWPs). The Planning Area for the VPHCP is the geographical extent of land that will be included in the VPHCP and for which the protections provided under the VPHCP are afforded to the seven focal species. For the City's VPHCP, these lands include the entire jurisdictional boundaries of the City and three areas owned by the City's Public Utilities Department in the unincorporated portion of San Diego County. The Planning Area's extent is, by design, the area covered by the City's Multiple Species Conservation Program (MSCP); the VPHCP is a separate but compatible conservation plan for vernal pools and seven endangered focal species that are not federally covered under the City's MSCP.

Many lands included in the Planning Area are not under the local land use jurisdiction of the City. These lands could include special districts such as school districts, water districts, military lands, other federal properties, and state lands. The regulatory requirements of the VPHCP are not applicable to lands not under the land use jurisdiction of the City. If land ownership is transferred and subsequently comes under the City's jurisdiction, or if the owner voluntarily requests inclusion, the VPHCP regulatory requirements will be applied after undergoing the appropriate amendment process, as outlined in the VPHCP.

The TWPs focus on seven target vernal pool species consisting of five plants and two crustaceans:

- Otay Mesa mint (*Pogogyne nudiuscula*)
- San Diego mesa mint (*Pogogyne abramsii*)
- Spreading navarretia (*Navarretia fossalis*)
- San Diego button-celery (*Eryngium aristulatum* var. *parishii*)
- California Orcutt grass (*Orcuttia californica*)
- Riverside fairy shrimp (*Streptocephalus wootoni*)
- San Diego fairy shrimp (*Branchinecta sandiegonensis*)

The TWP topics are as follows:

- TWP 1: Focal Species Status Update in the City of San Diego
- TWP 2: Assessment of Focal Species Conservation
- TWPs 3 & 4: Adaptive Management and Monitoring Strategy for the City of San Diego Vernal Pool Habitat Conservation Plan (a combined document)
- TWP 5: Cost Evaluation for Implementation of Management and Monitoring
- TWP 6: Recommendations for Conditions of Coverage
- TWP 7: Conservation Analysis
- TWP 8: Preserve Management Funding Mechanisms

This is TWP 6, which recommends conditions of coverage for the seven focal species consistent with the goals and objectives of the VPHCP. It utilizes information, data, and analysis included in the previous TWPs 1 through 4 (AECOM 2012a, b, and c). This document identifies the following:

- A summary of conservation of vernal pools and focal species provided under the proposed VPHCP Preserve and two Preserve alternatives
- A rationale for why coverage is warranted for each focal species under the proposed VPHCP Preserve and two Preserve alternatives, based on quantitative and qualitative data
- Special conditions required for coverage
- Additional requirements or changes necessary for coverage under the proposed VPHCP Preserve and two Preserve alternatives

1.2 OVERVIEW OF PROPOSED VPHCP PRESERVE AND ALTERNATIVES

The proposed VPHCP Preserve (the Project) would conserve lands subject to City jurisdiction and include 2,183 vernal pools within a total of 53 vernal pool complexes.[1] There are two alternative Preserve boundaries. Alternative 1 (Baseline) would conserve fewer vernal pools than the Project and include 1,644 vernal pools within a total of 37 complexes in the Preserve. Alternative 2 (Expanded Conservation) would conserve 35 more pools than the Project, generally located on Del Mar Mesa and Otay Mesa, and include a total of 2,218 vernal pools

[1] Vernal pool complexes may include two to several hundred individual vernal pools (Keeler-Wolf et al. 1998). Typically, the pools in a complex are geographically and biologically connected through the landscape, including the supporting watershed and upland habitats. These vernal pool complexes were given identification numbers by Bauder (1986). The numbers were updated by the City of San Diego's Vernal Pool Inventory (2004) and again updated by SANDAG Service Bureau (2012).

within the same 53 complexes as the Project. TWP 2 (AECOM 2012b) provides more detail on the Project and two alternatives.

1.3 AREA OF ANALYSIS FOR COVERAGE DETERMINATION

There are 10,668 known vernal pools within the overall VPHCP Planning Area. This includes 7,531 vernal pools on Marine Corps Air Station (MCAS) Miramar[2]. This VPHCP process addresses lands subject to the City's jurisdiction that are both inside and outside of the VPHCP Preserve, as well as lands outside the City's jurisdiction that are both inside and outside of the VPHCP Preserve to provide a regional context. The VPHCP does not address the 7,531 pools on MCAS Miramar, as the vernal pool data is confidential and MCAS Miramar is not within the City's jurisdiction. The rationale for coverage for the VPHCP Preserve is evaluated based on the conservation of focal species within lands subject to City jurisdiction only.

As shown in Table 1-1, the lands subject to City jurisdiction (highlighted in grey in the table) include 2,329 vernal pools that are subject to the City's jurisdiction. The analysis evaluates conservation for the Project and the two alternatives based on those 2,329 pools and associated seven focal species. It should be noted that existing conserved lands are also located within the VPHCP Preserve that are not subject to City jurisdiction (Item D in Table 1-1). These lands are not addressed in this conservation analysis because the City's land use jurisdiction does not apply to these areas; therefore, the lands cannot be made subject to the requirements of the VPHCP. These lands could be voluntarily added to the VPHCP with consent of the landowner; however, inclusion of these lands is not required for the City to obtain coverage under the VPHCP.

For lands subject to City jurisdiction outside the VPHCP Preserve (which would be lost to development), avoidance and minimization of impacts to the vernal pool and focal species is preferred where feasible, but not required. Where avoidance and minimization of impacts is not feasible, it is assumed that all vernal pools and associated focal species lost to development on City lands outside the Preserve will be mitigated appropriately within the VPHCP Preserve, as determined by the resource agencies. General requirements for mitigation are included in Section 2.4. The conditions of coverage (detailed in Tables 2-3 through 2-5) apply to vernal pools and focal species on lands subject to City jurisdiction within the VPHCP Preserve only. If a new focal species occurrence is identified and would be impacted by development, either within or outside the Preserve, then avoidance, minimization, and mitigation will be required.

[2] Refer to the MCAS Miramar Integrated Natural Resources Management Plan (INRMP) 2011-2015 (Gene Stout and Associates et al.) at http://www.marines.mil/unit/mcasmiramar/ems/Pages/NaturalResources.aspx. Basins include vernal pools as well as other features, such as marsh, puddles, impoundments, ditches, ruts, excavation, building foundation, and watercourse, all of which are considered vernal pool habitat and could contain focal species. Refer to p. 4-10 and 4-11 and Table 4.3.3. of the INRMP.

Table 1-1
Number of Vernal Pools within City's VPHCP Planning Area and Area of Analysis for Coverage Consideration

City Jurisdiction and Preserve Status	Number Of Pools		
VPHCP Planning Area (Total of A through E)	**10,668**		
A. MCAS Miramar (data confidential)	7,531		
	Project	**Alt 1**	**Alt 2**
VPHCP Preserve (B + D)	2,861	2,201	2,898
B. Inside Preserve, Not Subject to City's Jurisdiction	678	557	680
C. Outside Preserve, Not Subject to City's Jurisdiction	130	251	128
D. Inside Preserve, Subject to City's Jurisdiction*	2,183	1,644	2,218
E. Outside Preserve, Subject to City's Jurisdiction*	146	685	111
Pools Subject to City Jurisdiction in Conservation Analysis (D + E)	**2,329**	**2,329**	**2,329**

* The rows shaded in grey indicate the pools subject to City jurisdiction. These categories total 2,329 pools, which are included in the conservation analysis in TWP 2 and evaluated for coverage in TWP 6.

1.4 FOCAL SPECIES DATA OVERVIEW

The conservation analysis is based on the best available data on vernal pools and focal species within the City's jurisdiction, which is included in the City's comprehensive vernal pool database (SANDAG SB 2012). Refer to TWPs 1 and 2 for the detailed analysis of the vernal pool database (AECOM 2012a and b). Distributional information for the focal plant species within the City of San Diego is generally accurate and should be considered complete for purposes of this City-wide conservation analysis. The potential for finding additional pools with focal plant species within the City of San Diego is considered low. In comparison, the distributional information for the fairy shrimp species is not nearly as accurate and complete for many of the complexes in the City of San Diego. For some sites, where development has been proposed and extensive surveys have been conducted (such as the J 13 and J 34 complexes), existing data for shrimp species is relatively accurate. On other sites, surveys for fairy shrimp (protocol or otherwise) have not occurred or data is much more incomplete. For example, Otay Lakes (K 5) has well over 75 pools and none have been surveyed adequately; therefore, they are not considered to be occupied by fairy shrimp. However, AECOM's experience with qualitative monitoring of these unsurveyed sites suggests that fairy shrimp occurrence in those complexes is more common than existing data implies. For example, at Proctor Valley (R 1), the City's Vernal Pool Inventory (City of San Diego 2004) listed eight pools occupied by unknown *Branchinecta* species. In 2011, AECOM's protocol surveys identified three pools occupied by San Diego fairy shrimp, and 10 pools occupied by unknown *Branchinecta* species, for a total of 13 occupied pools. Thus, AECOM's protocol surveys identified five additional occupied pools, which is over 62% more pools than identified in the City's Vernal Pool Inventory. Similarly, at Carmel

Mountain (H 38), protocol surveys performed by others in 2011 identified two pools occupied by San Diego fairy shrimp and nine pools occupied by unknown *Branchinecta* species, compared to the City's Vernal Pool Inventory data, which only included eight pools occupied by unknown *Branchinecta* (over 37% more pools).

Further, seasonal variability in ponding as a result of varying rainfall amounts and patterns can affect shrimp occupancy in vernal pools from year to year (Bauder 2005; Simovich and Ripley 2008). This variability can result in substantial differences in fairy shrimp occupancy data at a site between years. Protocol surveys performed by RECON in 1997/1998 on MCB Camp Pendleton identified 216 pools on the bases as occupied by fairy shrimp (RECON 1998). Basewide protocol surveys in 2005 identified 279 occupied pools (USFWS 2008), and 29% increase in observed occupancy. AECOM's experience conducting multi-year protocol fairy shrimp surveys at sites such as MCAS Miramar, Marine Corps Base (MCB) Camp Pendleton, and Otay Mesa further substantiates seasonal variability in fairy shrimp occupancy data (note that site-specific data is confidential).

These examples, as well as qualitative assessments and general observations, suggest the possibility that many additional Riverside and San Diego fairy shrimp occurrences are possible in the City of San Diego. The fact that distributional data for fairy shrimp is likely incomplete must be taken into account when considering the coverage provided under the VPHCP. It is possible that more pools with focal fairy shrimp may be lost or conserved within the VPHCP Preserve than currently estimated. However, it is likely that more comprehensive surveys have been conducted for vernal pools that will be lost to development compared to pools that are already conserved or planned for conservation. Detailed surveys are required for development projects and, therefore, more data is available for pools that will be lost as a result of proposed development projects. For this reason, it is assumed that the conservation of pools occupied by the fairy shrimp focal species within the VPHCP Preserve is underestimated. In other words, the VPHCP Preserve likely conserves more occupied pools than identified in this evaluation.

It is also important to note that the City does not have jurisdiction over the entire distributional ranges for any of the seven focal species, and, therefore, does not have responsibility to protect the entire range of any species. For example, five of the seven VPHCP focal species occur on MCAS Miramar (Otay Mesa mint and Riverside fairy shrimp do not occur on MCAS Miramar), which has 7,531 pools (Table 1-2). Four of the focal species (spreading navarretia, San Diego button-celery, San Diego fairy shrimp, and Riverside fairy shrimp) are known to occur in many of the 2,300 pools on MCB Camp Pendleton (specific data is confidential) and elsewhere (Ramona, San Marcos, Chula Vista, Santa Rosa Plateau, Hemet, Skunk Hollow, and Baja California).

Table 1-2
MCAS Miramar Vernal Pools Occupied by the VPHCP Focal Species

Total Number of Pools	Number of Vernal Pools Occupied by Focal Species				
	POAB	ERAR	NAFO	ORCA	SDFS
7,531	1,112	1,795	6	2	4,051

Source: SANDAG 2011
POAB = San Diego mesa mint
ERAR = San Diego button-celery
NAFO = Spreading navarretia
ORCA = California Orcutt grass
SDFS = San Diego fairy shrimp

CHAPTER 2
RATIONALE AND CONDITIONS FOR COVERAGE

This chapter identifies the criteria for determination of coverage for each of the seven focal species. Based on these criteria, coverage for each of the seven VPHCP focal species populations within the proposed Project and two alternative Preserve boundaries is evaluated. This evaluation is based, in part, on the information, data, and analysis contained in the previous TWPs 1 through 4 (AECOM 2012a, b, and c), as well as AECOM's best expert opinion. The vernal pools that are subject to this evaluation are those within the City's jurisdiction, both inside and outside the Preserve, as described in Section 1.3.

2.1 COVERAGE CRITERIA

Coverage for the focal species is based upon the VPHCP requirement for long-term management and monitoring of pools once conserved within the Preserve. Complex-specific management and monitoring will follow the strategy outlined in TWPs 3 & 4 (AECOM 2012c) and the draft City of San Diego Vernal Pool Management (in preparation), which will be adopted at the same time as the proposed VPHCP.

Coverage criteria for the seven focal species have been developed consistent with the identified VPHCP biological goal and complex and species-specific objectives (Attachment A). In addition, conservation of the unique genetics of the focal species is considered necessary for coverage in order to maintain the "effective population size" of each focal species at a complex level. An "effective population size" is defined as the number of individuals in an idealized population that has a value of any given population genetic quantity equal to the value of that quantity in the population of interest (Wright 1938; Charlesworth 2009; Crow 2010). In more general terms, the "effective population size" refers to the portion of a population that is required to represent the full genetic potential of that population. In other words, some individuals are genetically similar to other individuals, so protecting every individual is not necessary to protect the genetic potential of the overall population within a complex. Research suggests that the effective population size is, in general, less than 50% of the census population (Wright 1938; Charlesworth 2009; Crow 2010). The means that conserving at least 50% of a census population would most likely conserve the entire genetic potential of that population.

The three criteria that must be met to consider each focal species covered under the VPHCP within the Preserve are as follows:

1. All complexes occupied with the focal species are conserved at some level (75%, 94%, or 100% conservation level[3]),
2. All complexes identified in the U.S. Fish and Wildlife Service (USFWS) Recovery Plan (1998) Appendix F as necessary to stabilize (i.e., conserve, manage, and restore) the focal species populations are conserved at some level (75%, 94%, or 100% conservation level), and
3. The focal species population genetics within any given complex is conserved (i.e., at least 50% of occupied vernal pools within a complex are conserved at some level to conserve the genetics of the effective population, as discussed above).

Coverage determination for the focal species is based on the best available scientific data and research. It should be noted that further research is necessary to address some of the inherent uncertainties in the available information on the focal species that relate to the conditions of coverage (e.g., the lack of scientific understanding regarding the relationship between focal species genetics and population viability). Additional research efforts will be identified in VPHCP in the context of the adaptive management and monitoring strategy discussed in TWPs 3 & 4 (AECOM 2012c).

2.2 COMPARISON OF ALTERNATIVES

The Project and two alternatives were analyzed in detail in TWP 2 (AECOM 2012b). Table 2-1 summarizes the analysis from TWP 2, including the vernal pool and focal species conservation provided by each of the three alternatives, as well as the percentage of focal species populations conserved. Table 2-2 summarizes the acres of critical habitat conserved under each alternative.

[3] The City has designated conservation levels (75, 94, or 100%) for each parcel within the VPHCP Preserve. The conservation level denotes the portion of a parcel that will be conserved. For example, for a parcel designated with a 75% conservation level, 25% of the parcel is available for development. Development would occur on the least environmentally sensitive area of the parcel, as determined by the City environmental review process.

Table 2-1
Summary of Vernal Pool and Focal Species Conservation Inside and Outside the VPHCP Preserve Subject to the City's Jurisdiction

Alternative	Number of Pools in Planning Area Subject to City's Jurisdiction	Number of Complexes within VPHCP Preserve Subject to City's Jurisdiction	Number of Pools within VPHCP Preserve Subject to City's Jurisdiction	Number of Pools Conserved within Preserve Based on Conservation Level*	Number of Pools Lost to Development (Outside and Inside Preserve) Based on Conservation Level*	Consistent with USFWS Recovery Plan for Stabilizing Focal Species[1]	Consistent with USFWS Recovery Plan to Reclassify Focal Species[2]	% Vernal Pools Conserved Based on Conservation Level*	Occupied Focal Species Pools Conserved within Preserve Subject to City's Jurisdiction (%)*						
									PONU	POAB	NAFO	ERAR	ORCA	RFS	SDFS
Project	2,329	53	2,183	2,109	220 (146 Outside/ 74 Inside)	Yes	Yes	90.6	100	96.9	98.9	99.0	100	99.1	87.9
Alternative 1 – Baseline	2,329	37	1,644	1,621	708 (685 Outside/ 23 Inside)	No	No	69.6	100	79.0	98.9	93.7	100	96.0	79.2
Alternative 2 – Expanded Conservation	2,329	53	2,218	2,133	196 (111 Outside/ 85 Inside)	Yes	Yes	91.6	100	96.9	98.9	99.3	100	99.1	88.3

*Pools and species population conserved is based on 75%, 94%, and/or 100% conservation level by vernal pool complex. See TWP 2 for more detail on the conservation analysis.
[1] Conserves (at some level) the complexes identified in Appendix F of the USFWS Recovery Plan (1998) as "necessary to stabilize" the focal species.
[2] Conserves (at some level) the complexes identified in Appendix G of the USFWS Recovery Plan (1998) as "necessary to reclassify" the focal species.

PONU = Otay Mesa mint
POAB = San Diego mesa mint
NAFO = Spreading navarretia
ERAR = San Diego button-celery
ORCA = California Orcutt grass
RFS = Riverside fairy shrimp
SDFS = San Diego fairy shrimp

Table 2-2
Summary of Critical Habitat Conservation by Alternative

	NAFO Critical Habitat Acres	Proposed RFS Critical Habitat Acres	SDFS Critical Habitat Acres
Total Critical Habitat Acres in Planning Area	624	847	1,834
Critical Habitat Conserved by Alternative[1]	**Total Acres Conserved and % of Acres Conserved in Planning Area**		
Project	575 (92.3%)	777 (91.8%)	1,475 (80.4%)
Alternative 1 – Baseline	517 (82.9%)	724 (85.5%)	1,287 (70.1%)
Alternative 2 – Expanded Conservation	597 (95.7%)	784 (92.6%)	1,613 (87.9%)

[1] Based conservation level (75%, 94%, or 100%); refer to TWP 2 (AECOM 2012b) for more detail.
NAFO = Spreading navarretia
RFS = Riverside fairy shrimp
SDFS = San Diego fairy shrimp

Overall, Alternative 2 (Expanded Conservation) would provide the most coverage for both vernal pools (91.6% conserved) and individual focal species. The Project would provide only slightly less coverage for vernal pools (90.6% conserved) compared to Alternative 2, with 24 (1%) fewer vernal pools conserved. Alternative 1 (Baseline) would provide the least amount of coverage for vernal pools (69.6% conserved), with 488 (21.0%) and 512 (22.0%) fewer conserved pools than the proposed Project and Alternative 2, respectively.

With regard to the seven focal species, all three alternatives would provide the same percentage of conservation for known locations of Otay Mesa mint (100%), spreading navarretia (98.9%), and California Orcutt grass (100.0%) populations within the Preserve on lands subject to City jurisdiction (Table 2-1). The proposed Project and Alternative 2 would provide the same percentage of conservation for San Diego mesa mint (96.9%) and Riverside fairy shrimp (99.1%), and nearly the same percentage of conservation for San Diego button-celery (99.0% vs. 99.3%) and San Diego fairy shrimp (87.9% vs. 88.3%). Alternative 1 would provide a lower percentage of conservation for these four species compared to both the Project and Alternative 2.

As summarized in Table 2-1, both the Project and Alternative 2 provide conservation of the complexes identified in the USFWS Recovery Plan as important to stabilize each of the focal species populations, which is an objective of the VPHCP. Therefore, they are considered consistent with the USFWS Recovery Plan. Alternative 1 (Baseline) is not consistent because it does not conserve all of the complexes identified in the USFWS Recovery Plan. More detail regarding consistency with the USFWS Recovery Plan is provided in Tables 2-3 through 2-5.

Note that consistency with Appendix G of the USFWS Recovery Plan (i.e., complexes identified as necessary to "reclassify" the focal species population) is evaluated in TWP 2 but is not a condition of coverage because reclassification of the focal species is not an objective of the VPHCP (refer to Attachment A).

Table 2-2 shows the total acres of critical habitat for each applicable species conserved within each alternative (based on conservation level), as well as the percentage of critical habitat acres conserved within the overall VPHCP planning area. Alternative 2 provides the most conservation of critical habitat for the three applicable focal species (spreading navarretia, Riverside fairy shrimp, and San Diego fairy shrimp). The Project conserves slightly less critical habitat for spreading navarretia and Riverside fairy shrimp compared to Alternative 2, and approximately 138 fewer acres of San Diego fairy shrimp critical habitat (7.5% less). Alternative 1 provides the least conservation of critical habitat. While conservation of focal species' critical habitat is not a criterion for coverage in this TWP, this information is provided for consideration during the City's VPHCP development process.

2.3 FOCAL SPECIES COVERAGE DETERMINATION

This section provides the rationale and conditions of coverage for the Project and two alternatives. The following information is provided for each focal species under the Project (Table 2-3), Alternative 1 – Baseline (Table 2-4), and Alternative 2 – Expanded Conservation (Table 2-5):

- Percentage of population conserved within and outside of the VPHCP Preserve (on lands subject to City jurisdiction)
- Percentage of population within and outside of the VPHCP Preserve that will be lost to development (on lands subject to City jurisdiction),
- Coverage determination for VPHCP Preserve
- Rationale for considering a species covered (or not covered) under the VPHCP (based on the criteria identified in Section 2.1)
- Conditions for coverage and/or additional requirements to obtain coverage
- Coverage determination based on VPHCP conditions

For each species, rationale is provided to determine and maintain coverage under each alternative within the VPHCP Preserve (Tables 2-3, 2-4, and 2-5). In some cases where the coverage criteria are not met for a focal species, special additional conditions/requirements are necessary for

coverage. Note that consistency with Coverage Criteria 1 and 2 is dictated by the Preserve boundaries. Under this analysis, it is not an option to modify the Preserve boundaries for the alternatives; therefore, conditional coverage is not possible for Preserve alternatives that do not meet Coverage Criteria 1 and 2. Conditional coverage is only possible for specific complexes occupied by focal species that do not meet Coverage Criterion 3 in the form of onsite mitigation to conserve focal species genetics.

In summary, five of the seven focal species would be considered covered under the VPHCP for both the Project and Alternative 2 based on the conservation provided by the Preserve boundary. San Diego button-celery and San Diego fairy shrimp would not be considered covered under the Project and Alternative 2 because Coverage Criterion 3 (Section 2.1) would not be met for these species (refer to Tables 2-3 and 2-5 for detail). Therefore, special conditions have been developed so that Coverage Criterion 3 would be met for San Diego button-celery and San Diego fairy shrimp. These special conditions (in the form of in-kind mitigation via salvage of genetic material to conserve unique focal species genetics, as detailed in Tables 2-3 and 2-5) would be requirements of the VPHCP. With the additional coverage conditions, the VPHCP would provide coverage for all seven focal species under the Project and Alternative 2.

Alternative 1 (Table 2-4) would not provide coverage for any of the focal species except California Orcutt grass. Coverage Criteria 1 and/or 2 are not met for the other six focal species. Therefore, conditional coverage is not possible for those species (as explained above).

Table 2-3
Rationale and Conditions for Coverage for Focal Species under the City of San Diego VPHCP – Project[1]

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Plant Species								
Otay Mesa mint (*Pogogyne nudiuscula*)	100% (368 out of 368 occupied pools)	None	None	None	**Criterion 1: Yes** All complexes occupied with Otay Mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Otay Mesa mint would be conserved at some level. **Criterion 3: Yes** The entire known population of Otay Mesa mint within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the currently known Otay Mesa mint population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Otay Mesa mint is maintained in perpetuity.	Yes
San Diego mesa mint (*Pogogyne abramsii*)	97% (271 out of 280 occupied pools)	3% (9 out of 280 occupied pools)	None	3% (9 out of 280 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego Mesa mint would be conserved at some level. **Criterion 3: Yes** No vernal pools with this focal species would be completely lost (i.e., 0% conserved). Some pools occur within a 75%	Yes	Conditions of Coverage: • Development of complexes with a 75% (U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation level that contain pools with San Diego Mesa mint must avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the currently known San Diego mint population	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					(U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation-level area, which would result in a potential 3% (approximate) loss of the population within the VPHCP planning area under the City's jurisdiction. However, at least 50% of the occupied pools would be conserved at each of these complexes. Therefore, the genetics would be conserved.		within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego Mesa mint is maintained in perpetuity.	
Spreading navarretia (*Navarretia fossalis*)	99% (94 out of 95 occupied pools)	None	1% (1 out of 95 occupied pools)	1% (1 out of 95 occupied pools)	**Criterion 1: Yes** All complexes occupied with spreading navarretia would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize spreading navarretia would be conserved at some level. **Criterion 3: Yes** One pool with spreading navarretia at J 13 N (NDU 1 & 2) would be lost. One other pool in the J 13 N complex containing spreading navarretia (at South Otay 1 acre – City) would be conserved; therefore, at least 50% of the local genetics at this complex would be conserved.	Yes	<u>Conditions of Coverage:</u> • Mitigation is necessary for the loss of the one pool with spreading navarretia at J 13 N. General mitigation conditions are detailed in Section 2.4. • Of the currently known spreading navarretia population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of spreading navarretia is maintained in perpetuity.	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	99% (602 out of 608 occupied pools)	0.2% (1 out of 608 occupied pools)	0.8% (5 out of 608 occupied pools)	1% (6 out of 608 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego button-celery would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego button-celery would be conserved at some level. **Criterion 3: No** Four pools occupied with San Diego button-celery occur within a 75% conservation-level area (two at H 1-10, 13-15, 18-26 Del Mar Mesa Private, and two at U 19 Cubic), which would result in some potential loss of the population. Five pools with this focal species would be completely lost (i.e., 0% conserved) at the following complexes: one pool each at J 13 E, J 13 S, and J 35, and two pools at J 13 N. The local genetics would not be conserved at J 13 E (the only occupied pool would be lost), J 13 N (two out of three pools would be lost), and J 35 (the only occupied pool would be lost) because more than 50% of the pools with San Diego button-celery would be lost at each complex unless	No	<u>Additional Requirements for Coverage:</u> • For San Diego button-celery to be covered under the Project, the local genetics at complexes J 13 E, J 13 N, and J 35 would need to be conserved via onsite restoration (using salvaged genetic material) of one additional pool with San Diego button-celery at each of these sites. Mitigation for the lost pools at J 13 E and J 13 N could be conducted within the overall J 13 complex series. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex). - Final success criteria must be developed such that at the end of 5 years, the	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					subsequent surveys or additional conservation determines that at least 50% of the pools with this focal species is conserved.		translocated population size is equal to or greater than the population size prior to development. Conditions of Coverage: • Development of complexes with a 75% conservation level that contain pools with San Diego button-celery (H 1-10, 13-15, 18-26, Del Mar Mesa Private, and U 19 Cubic) must avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the currently known San Diego button-celery population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego button-celery is maintained in perpetuity.	
California Orcutt grass (*Orcuttia californica*)	100% (58 out of 58 occupied pools)	None	None	None	**Criterion 1: Yes** All complexes occupied with California Orcutt grass would be conserved at some level.	Yes	Conditions of Coverage: • Of the currently known California Orcutt grass	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					Criterion 2: Yes All complexes identified in the USFWS Recovery Plan as necessary to stabilize California Orcutt grass would be conserved at some level. **Criterion 3: Yes** The entire known population of California Orcutt grass within the area subject to the City's jurisdiction for the VPHCP would be conserved.		population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of California Orcutt grass is maintained in perpetuity.	
Focal Fairy Shrimp Species								
Riverside fairy shrimp (*Streptocephalus wootoni*)	99% (131 out of 132 occupied pools)	None	0.76% (1 out of 132 occupied pools)	0.76% (1 out of 132 occupied pools)	**Criterion 1: Yes** All complexes occupied with Riverside fairy shrimp would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Riverside fairy shrimp would be conserved at some level. **Criterion 3: Yes** Only one pool at J 34 (Candlelight) would be lost (0% conserved). However, the other pool containing Riverside fairy shrimp at J 34 (Candlelight) would be conserved; therefore, at least 50% of the local genetics would be conserved at that complex.	Yes	<u>Conditions of Coverage:</u> • Mitigation is necessary for the loss of the pool with this focal species at J 34. General mitigation conditions are detailed in Section 2.4. • Of the currently known Riverside fairy shrimp population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Riverside fairy shrimp is maintained in perpetuity.	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
San Diego fairy shrimp (*Branchinecta sandiegonensi*)	88% (432 out of 491 occupied pools)	2% (10 out of 491 occupied pools)	10% (49 out of 491 occupied pools)	12% (59 out of 491 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego fairy shrimp would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego fairy shrimp would be conserved at some level. **Criterion 3: No** Some pools with San Diego fairy shrimp are within a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation-level area. Some pools with San Diego fairy shrimp would be completely lost (0% conserved) occurring in complexes I 12 (four pools), J 13 N (13 pools), J 13 S (two pools), J 34 (16 pools), J 35 (three pools), N 5-6 (seven pools), and Q 3 (four pools). Less than 50% of the pools with San Diego fairy shrimp would be conserved at I 12 (four out of six pools), J 13 N (13 out of 13 pools), J 13 S (two out of two pools), J 34 (16 out of 16 pools), and J 35 (three out of three pools), unless subsequent surveys or additional conservation determines that at least 50% of	No	<u>Additional Requirements for Coverage:</u> • To be covered under the Project, the local genetics of San Diego fairy shrimp at complexes I 12, J 13 N, J 13 S, J 34, and J 35 would need to be conserved via onsite restoration using salvaged local genetics. Mitigation for the lost pools at J 13 N and J 13 S could be conducted within the overall J 13 complex series. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex). - Final success criteria must be developed such that at the end of 5 years, the translocated population size is equal to or greater than	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					the pools with this focal species is conserved.		the population size prior to development. Conditions of Coverage: • Development of complexes with a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation level that contain pools with San Diego fairy shrimp must avoid or mitigate for loss those pools. General mitigation conditions are detailed in Section 2.4. • Of the currently known San Diego fairy shrimp population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego fairy shrimp is maintained in perpetuity.	

VPHCP = City of San Diego Vernal Pool Habitat Conservation Plan
[1] Detailed data analysis is provided in TWP 2 (AECOM 2012b).

Table 2-4
Rationale and Conditions for Coverage for Focal Species under the City of San Diego VPHCP – Alternative 1 (Baseline)

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Plant Species								
Otay Mesa mint (*Pogogyne nudiuscula*)	100% (386 out of 386 occupied pools)	None	None	None	**Criterion 1: Yes** All complexes occupied with Otay Mesa mint would be conserved at some level. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize Otay Mesa mint would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: Yes** The entire known population of Otay Mesa mint within the area subject to the City's jurisdiction for the VPHCP would be conserved.	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for Otay Mesa mint because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No
San Diego mesa mint (*Pogogyne abramsii*)	79% (221 out of 280 occupied pools)	3% (8 out of 280 occupied pools)	18% (51 out of 280 occupied pools)	21% (59 out of 280 occupied pools)	**Criterion 1: No** Not all complexes occupied with San Diego mesa mint would be conserved. Complexes C 27, I 1, I 6 B, I 6 C, N 1-4, U 15, and U 19 are occupied with San Diego mesa mint and would be 0% conserved. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize San	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for San Diego mesa mint because it does not conserve all occupied complexes. In addition, the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					Diego mesa mint would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: No** Complexes C 27, I 1, I 6 B, I 6 C, N 1-4, U 15, and U 19 are occupied with San Diego mesa mint and would be 0% conserved. Therefore, the local genetics would be completely lost at these complexes.			
Spreading navarretia (*Navarretia fossalis*)	99% (94 out of 95 occupied pools)	None	1% (1 out of 95 occupied pools)	1% (1 out of 95 occupied pools)	**Criterion 1: Yes** All complexes occupied with spreading navarretia would be conserved at some level. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize spreading navarretia would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: Yes** One pool with spreading navarretia at J 13 N (NDU 1 & 2) would be lost. One other pool in the J 13 N complex containing spreading navarretia (at South Otay 1 acre – City) would be conserved; therefore, at least 50% of the local genetics would be conserved.	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for spreading navarretia because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	94% (570 out of 608 occupied pools)	None	6% (38 out of 608 occupied pools)	6% (38 out of 608 occupied pools)	**Criterion 1: No** Not all complexes occupied with San Diego button-celery would be conserved, including I 1, I 6 C, and J 13 S (0% conservation). **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego button-celery would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: No** Two pools occupied with San Diego button-celery within a 75% conservation-level area (two at H 1-10, 13-15, 18-26 Del Mar Mesa Private) would result in some potential loss of the population. A total of 38 pools with San Diego button-celery would be completely lost (i.e., 0% conserved) at the following complexes: six pools at H 1-10, 13-15, 18-26 Rhodes, two pools at H 33, 15 pools at I 1, two pools at I 6 C, one pool at J 13 E, two pools at J 13 N, 7 pools at J 13 S, one pool at J 35, and two pools at U 19. The local genetics would not be conserved at H 33 (two out of two pools lost), I 1 (15 out of 15 pools lost), I 6 C (two	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for San Diego button-celery because it does not conserve all occupied complexes. In addition, the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					out of two pools lost), J 13 N (two out of three pools would be lost), J 13 S (seven out of seven pools lost), J 35 (the only occupied pool would be lost), and U 19 (two out of two pools lost) because more than 50% of the pools with San Diego button-celery would be lost at each complex.			
California Orcutt grass (*Orcuttia californica*)	100% (58 out of 58 occupied pools)	None	None	None	**Criterion 1: Yes** All complexes occupied with California Orcutt grass would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize California Orcutt grass would be conserved at some level. **Criterion 3: Yes** The entire known population of California Orcutt grass within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	<u>Conditions of Coverage:</u> • Of the currently known California Orcutt grass population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of California Orcutt grass is maintained in perpetuity.	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Fairy Shrimp Species								
Riverside fairy shrimp (*Streptocephalus wootoni*)	96% (127 out of 132 occupied pools)	None	4% (5 out of 132 occupied pools)	4% (5 out of 132 occupied pools)	**Criterion 1: Yes** All complexes occupied with Riverside fairy shrimp would be conserved at some level. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize Riverside fairy shrimp would be conserved, including J 13 S, J 20-21, and J 21 (0% conserved). **Criterion 3: No** Both occupied pools at J 34 (Candlelight) would be lost. Therefore, none of the local genetics would be conserved at that complex.	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for Riverside fairy shrimp because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	79% (389 out of 491 occupied pools)	<0.5% (2 out of 491 occupied pools)	20.4% (100 out of 491 occupied pools)	21% (102 out of 491 occupied pools)	**Criterion 1: No** Not all complexes occupied with San Diego fairy shrimp would be conserved. Complexes C 27, F 16-17, I 1, I 6 B, I 6 C, J 13 S, J 20-21, N 1-4, Q 3, U 15, and U 19 would be 0% conserved. **Criterion 2: No** Not all complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego fairy shrimp would be conserved, including F 16-17, J 13 S, J 20-21, and J 21 (0% conserved).	No	It is not possible for the Preserve as designed under Alternative 1 (Baseline) to provide coverage for San Diego fairy shrimp because the boundary does not include the complexes necessary to be consistent with the USFWS Recovery Plan.	No

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					Criterion 3: No Less than 50% of the pools with San Diego fairy shrimp would be conserved at I 12 (four out of six pools lost) and J 35 (the only occupied pools would be lost).			

VPHCP = City of San Diego Vernal Pool Habitat Conservation Plan

[1] Refer to Section 1.3 for a description of the area of analysis for coverage within the VPHCP Preserve. Detailed data analysis is provided in TWP 2 (AECOM 2012b).

Table 2-5
Rationale and Conditions for Coverage for Focal Species under the City of San Diego VPHCP – Alternative 2 (Expanded Conservation)

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
Focal Plant Species								
Otay Mesa mint (*Pogogyne nudiuscula*)	100% (368 out of 368 occupied pools)	None	None	None	**Criterion 1: Yes** All complexes occupied with Otay Mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Otay Mesa mint would be conserved at some level. **Criterion 3: Yes** The entire known population of Otay Mesa mint within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the currently known Otay Mesa mint population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Otay Mesa mint is maintained in perpetuity.	Yes
San Diego mesa mint (*Pogogyne abramsii*)	97% (271 out of 280 occupied pools)	3% (9 out of 280 occupied pools)	None	3% (9 out of 280 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego mesa mint would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego Mesa mint would be conserved at some level.	Yes	Conditions of Coverage: • Development of complexes with a 75% (U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation level that contain pools with San Diego Mesa mint must	

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					Criterion 3: Yes No vernal pools with this focal species would be completely lost (i.e., 0% conserved). Some pools occur within a 75% (U 15 Sander and U 19 Cubic) or 94% (B 7-8 Lopez Ridge and N 5-6 Montgomery Field) conservation-level area, which would result in a potential 3% (approximate) loss of the population within the VPHCP planning area under the City's jurisdiction. However, at least 50% of the occupied pools would be conserved at each of these complexes. Therefore, the genetics would be conserved.		avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the currently known San Diego mint population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego Mesa mint is maintained in perpetuity.	
Spreading navarretia (*Navarretia fossalis*)	99% (94 out of 95 occupied pools)	None	1% (1 out of 95 occupied pools)	1% (1 out of 95 occupied pools)	**Criterion 1: Yes** All complexes occupied with spreading navarretia would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize spreading navarretia would be conserved at some level. **Criterion 3: Yes** One pool with spreading navarretia at J 13 N (NDU 1 & 2) would be lost. One other pool in the J 13 N complex containing spreading	Yes	<u>Conditions of Coverage:</u> • Mitigation is necessary for the loss of the one pool with spreading navarretia at J 13 N. General mitigation conditions are detailed in Section 2.4. • Of the currently known spreading navarretia population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal	

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					navarretia (at South Otay 1 acre – City) would be conserved in proximity; therefore, at least 50% of the local genetics at this complex would be conserved.		pool complexes in the Preserve such that long-term viability of spreading navarretia is maintained in perpetuity.	
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	99% (604 out of 608 occupied pools)	0.2% (1 out of 608 occupied pools)	0.5% (3 out of 608 occupied pools)	0.7% (4 out of 608 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego button-celery would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego button-celery would be conserved at some level. **Criterion 3: No** Some pools occupied with San Diego button-celery occur within a 75% conservation-level area (H 1-10, 13-15, 18-26 Del Mar Mesa Private, J 13 E, J 13 S, and U 19), which would result in some potential loss of the population. Three pools with this focal species (two in J 13 N [NDU 1 & 2] and one in J 35) would be completely lost (i.e., 0% conserved). The local complex genetics would not be conserved at sites J 13 N (two out of three pools would be lost), and J 35 (the only occupied pool would be lost) because more than 50% of the	No	<u>Additional Requirements for Coverage:</u> • For San Diego button-celery to be covered under the Project, the local genetics at complexes J 13 N and J 35 would need to be conserved via onsite restoration (using salvaged genetic material) of one pool with San Diego button-celery at each of these sites. Mitigation for the lost pools at J 13 N could be conducted within the overall J 13 complex series. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex).	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					pools occupied with San Diego button-celery would be lost, unless subsequent surveys or additional conservation determines that at least 50% of the pools with this focal species is conserved.		- Final success criteria must be developed such that at the end of 5 years, the translocated population size is equal to or greater than the population size prior to development. Conditions of Coverage: • Development of complexes with a 75% conservation level that contain pools with San Diego button-celery (H 1-10, 13-15, 18-26 Del Mar Mesa Private, and U 19 Cubic) must avoid or mitigate for loss of those pools. General mitigation conditions are detailed in Section 2.4. • Of the currently known San Diego button-celery population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego button-celery is maintained in perpetuity.	

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
California Orcutt grass (*Orcuttia californica*)	100% (58 out of 58 occupied pools)	None	None	None	**Criterion 1: Yes** All complexes occupied with California Orcutt grass would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize California Orcutt grass would be conserved at some level. **Criterion 3: Yes** The entire known population of California Orcutt grass within the area subject to the City's jurisdiction for the VPHCP would be conserved.	Yes	Conditions of Coverage: • Of the currently known California Orcutt grass population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of California Orcutt grass is maintained in perpetuity.	Yes
Focal Fairy Shrimp Species								
Riverside fairy shrimp (*Streptocephalus wootoni*)	>99% (131 out of 132 occupied pools)	None	0.76% (1 out of 132 occupied pools)	0.76% (1 out of 132 occupied pools)	**Criterion 1: Yes** All complexes occupied with Riverside fairy shrimp would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize Riverside fairy shrimp would be conserved at some level. **Criterion 3: Yes** Only one pool at J 34 (Candlelight) would be lost (0% conserved). However, the other pool containing Riverside fairy shrimp at J 34 (Candlelight) would be conserved; therefore, at least 50% of the local genetics would be conserved at that	Yes	Conditions of Coverage: • Mitigation is necessary for the loss of the pool with this focal species at J 34. General mitigation conditions are detailed in Section 2.4. • Of the currently known Riverside fairy shrimp population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of Riverside	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					complex. In addition, mitigation would be required for the lost pool.		fairy shrimp is maintained in perpetuity.	
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	88% (434 out of 491 occupied pools)	2% (11 out of 491 occupied pools)	9% (46 out of 491 occupied pools)	12% (57 out of 491 occupied pools)	**Criterion 1: Yes** All complexes occupied with San Diego fairy shrimp would be conserved at some level. **Criterion 2: Yes** All complexes identified in the USFWS Recovery Plan as necessary to stabilize San Diego fairy shrimp would be conserved at some level. **Criterion 3: No** Some pools with San Diego fairy shrimp are within a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation-level area. Some pools with San Diego fairy shrimp would be completely lost (0% conserved) occurring in complexes I 12 (one pool), J 13 N (13 pools), J 13 S (two pools), J 34 (16 pools), J 35 (three pools), N 5-6 (seven pools), and Q 3 (four pools). Less than 50% of the pools with San Diego fairy shrimp would be conserved at J 13 N (13 out of 13 pools), J 13 S (two out of two pools], J 34 (16 out of 16 pools), and J 35 (three out of three pools), unless subsequent surveys or additional conservation	No	<u>Additional Requirements for Coverage:</u> • To be covered under the Project, the local genetics of San Diego fairy shrimp at complexes J 13 N, J 13 S, J 34, and J 35 would need to be conserved via onsite restoration using salvaged local genetics. Mitigation for the lost pools at J 13 N and J 13 S could be conducted within the overall J 13 complex series. • In addition to the general mitigation conditions included in Section 2.4, mitigation must include: - A cyst soil salvage and inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite (i.e., within the same vernal pool complex). - Final success criteria must be developed such that at the end of 5 years, the translocated population	Yes

Species	Population Conserved within Area Subject to City's Jurisdiction	Population Lost Inside Preserve within Area Subject to City's Jurisdiction	Population Lost Outside Preserve within Area Subject to City's Jurisdiction	Total Population Lost within Area Subject to City's Jurisdiction	Coverage Criteria Met?	Species Covered by VPHCP Based on Coverage Criteria?	Conditions for Coverage or Additional Requirements for Coverage	Species Covered by VPHCP Based on Additional Conditions of Coverage?
					determines that at least 50% of the pools with this focal species is conserved.		size is equal to or greater than the population size prior to development. Conditions of Coverage: • Development of complexes with a 75% (F 16-17, J 11 W, J 20-21, J 36, N 1-4, U 15, and U 19) or 94% (I 12 and N 5-6) conservation level that contain pools with San Diego fairy shrimp must avoid or mitigate for loss those pools. General mitigation conditions are detailed in Section 2.4. • Of the currently known San Diego fairy shrimp population within the Preserve, 100% conservation must be maintained for coverage. • The City must adopt a plan that provides directives for restoration, management, and monitoring of vernal pool complexes in the Preserve such that long-term viability of San Diego fairy shrimp is maintained in perpetuity.	

VPHCP = City of San Diego Vernal Pool Habitat Conservation Plan

[1] Refer to Section 1.3 for a description of the area of analysis for coverage within the VPHCP Preserve. Detailed data analysis is provided in TWP 2 (AECOM 2012b).

2.4 GENERAL CONDITIONS FOR MITIGATION

Vernal pools occupied by focal species that may be lost to development within the VPHCP Preserve (i.e., located within a 75% or 94% conservation level area) or outside the Preserve (i.e., 0% conservation) are required to be mitigated as a condition of coverage (see Tables 2-3 through 2-5). The following are general conditions for mitigation of vernal pools lost within and outside the Preserve.

1) Prepare and implement a 5-year restoration, maintenance, and monitoring plan that includes the following:

- A microtopographic analysis that demonstrates the remaining preserved areas within the complex are capable of providing adequate buffer and remaining watershed for the translocation basins.
- A salvage and translocation plan that collects focal species genetics from the complex through salvage of soil (shrimp cyst) and/or seed and plant material from each pool that will be lost to development.
- A seed collection, bulking, and on-site reseeding program for the focal plant species.
- A cyst inoculation program that identifies a specific translocation basin for each basin lost to development. Translocation will occur on a one-to-one basis onsite.
- If necessary, a topographic reconstruction plan that specifies topographic repairs to damaged basins that are targeted for the translocation effort.
- A weed eradication and control program with strict 5-year success criteria for low weed cover (e.g., less than 10%) in both the upland and vernal pool habitats.
- A detailed monitoring program that tracks restored focal species population health with strict 5-year success criteria for the vernal pools and upland watershed areas. For plants, the monitoring should include cover and density estimates. For the shrimp species, monitoring should include adult population numbers and cyst density estimates.
- Final success criteria must be developed such that at the end of 5 years, habitat conditions must be a quality such that the focal species population can be maintained in perpetuity.

2) Prepare and implement a long-term monitoring and management plan that includes the following:

- The method for protecting the biological resource values in perpetuity (e.g., conservation easement).
- The entity or organization proposed as owner and land manager of the preserve property.
- A description of the frequency and level of management and maintenance, data collection, electronic format, storage and reporting requirements, and strict long-term success criteria. Habitat conditions must be maintained at a high quality such that the focal species population can be maintained in perpetuity.
- An endowment based on a Property Analysis Record (PAR) or similar long-term cost estimation method to secure ongoing funding for specific perpetual management, maintenance, and monitoring activities identified in the plan.

CHAPTER 3
REFERENCES

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ATTACHMENT A

CITY OF SAN DIEGO VPHCP
BIOLOGICAL GOALS AND OBJECTIVES

ATTACHMENT A
CITY OF SAN DIEGO VPHCP BIOLOGICAL GOALS AND OBJECTIVES

VP HCP Biological Goal	VPHCP Habitat Objectives	Focal Species	VPHCP Species Specific Objectives*	
Contribute to the recovery and ensure continued persistence of theVPHCP focal vernal pool species populations by implementing the identified objectives.	1. Conserve in perpetuity at least 2,019 basins totaling approximately 31.5 acres within the VPHCP Preserve through development regulations and existing conserved basins in a configuration that maintains long-term viability of the VPHCP focal species. 2. Manage in perpetuity 53 vernal pool complexes within the VPHCP Preserve through implementation of the VPHCP Management and Monitoring Plan. 3. Restore 20 vernal pool complexes to a "Level 1" (stewardship) management condition within the VPHCP Preserve through implementation of the VPHCP Management and Monitoring Plan.	Otay Mesa Mint	1. Conserve and manage existing vernal pool complexes and their associated watersheds currently occupied by Otay Mesa mint within the Preserve (J2, J4-5, J14, J15, J30, J32, and J 33) to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan area and, in doing so, contribute to recovery of the species on a range-wide basis.	2. Conserve and restore vernal complexes identified by the USFWS Recovery Plan (1998) as necessary to stabilize Otay Mesa mint (J2, J11E, J11W, J12, J13E, J13N, J13S, J14, J16-18, J20-21, J21, J27, and J28E) to enhance genetic diversity and population stability of Otay Mesa mint.
		San Diego Mesa Mint	1. Conserve and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego mesa mint within the Preserve (B11, B6, C10-16, C17-18, C27, D5-8, H1-10, 13-15, 18-26, H39, I1, I6C, I6B, N1-4, N5-6, N8, U15, and U19) to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis.	2. Conserve and restore vernal complexes identified by the USFWS Recovery Plan (1998) as necessary to stabilize San Diego Mesa mint (D5-8, F16-17, H1-10, 13-15, 18-26, H33, N1-4, and N5-6) to enhance the genetic diversity and population stability of San Diego Mesa mint.
		Spreading Navarretia	1. Conserve and manage existing vernal pool complexes and their associated watersheds currently occupied by spreading navarretia within the Preserve (D5-8, J2, J4-5, J13N, J14, J15, J32, J33, K5, and X5) to maximize the likelihood that existing occurrences are sustained in the Plan area and, in doing so, contribute to recovery of the species on a range-wide basis.	2. Conserve and restore vernal complexes identified by the USFWS Recovery Plan (1998) as necessary to stabilize spreading navarretia (J2, J11E, J11W, J12, J13E, J13N, J13S, J14, J16-18, J20-21, J21, J27, J28E, K5, and R1) to enhance the genetic diversity and population stability of spreading navarretia.
		San Diego Button-Celery	1. Conserve and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve (B11, B7-8, C10-16, D5-8, H1-10, 13-15, 18-26, H33, H39, I1, I6C, J2, J4-5, J13N, J13S, J14, J15, J16-18, J27,	2. Conserve and restore vernal complexes identified by the USFWS Recovery Plan (1998) as necessary to stabilize San Diego button-celery (D5-8, F16-17, H1-10, 13-15, 18-26, H33, J2, J11E, J11W, J12, J13E, J13N, J13S, J14, J16-18, J20-12, J21, J27, J28E, K5, and R1) to enhance the genetic diversity and

* Refer to TWP 2 Attachment A for details on complexes occupied by focal species (column 1), and Appendix F of the USFWS Recovery Plan for complexes identified as necessary to stabilize the focal species populations (column 2).

ATTACHMENT A
CITY OF SAN DIEGO VPHCP BIOLOGICAL GOALS AND OBJECTIVES

VP HCP Biological Goal	VPHCP Habitat Objectives	Focal Species	VPHCP Species Specific Objectives*	
			J29, J30, J32, J33, K5, N8, and U19) to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis.	population stability of San Diego button-celery.
		California Orcutt's Grass	1. Conserve and manage existing vernal pools and their associated watersheds currently occupied by Orcutt's grass complexes within the Preserve (J2, J13N, J14, and J15) to maximize the likelihood that existing occurrences are sustained in the Plan area, and, in doing so, contribute to recovery of the species on a range-wide basis.	2. Conserve and restore vernal complexes identified by the USFWS Recovery Plan (1998) as necessary to stabilize California Orcutt's grass (J2, J11 E, J11W, J12, J13E, J13N, J13S, J14, J16-18, J20-21, J21, J27, and J28E) to enhance the genetic diversity and population stability of California Orcutt's grass.
		Riverside Fairy Shrimp	1. Conserve and manage existing vernal pool complexes and their associated watersheds currently occupied by Riverside fairy shrimp within the Preserve (J2, J4-5, J11W, J14, J15, J16-18, J29, J30, J31, J32, J33, and J34) to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis.	2. Conserve and restore vernal complexes identified by the USFWS Recovery Plan (1998) as necessary to stabilize Riverside fairy shrimp (J2, J11E, J11W, J12, J13E, J13N, J13S, J14, J16-18, J20-21, J21, J27, and J28E) to enhance the genetic diversity and population stability of Riverside fairy shrimp.
		San Diego Fairy Shrimp	1. Conserve and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve (B11, B7-8, C10-16, C27, D5-8, H1-10, 13-15, 18-26, H17, H38, I1, I6B, I6C, J2, J4-5, J11W, J14, J15, J29, J31, J32, J33, K5, MM1, N5-6, N8, Q2, R1, U15, U19, X5, and X7) to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.	2. Conserve and restore vernal complexes identified by the USFWS Recovery Plan (1998) as necessary to stabilize San Diego fairy shrimp (F16-18, H1-10, 13-15, 18-26, H33, J2, J11E, J11W, J12, J13E, J13N, J13S, J14, J16-18, J20-21, J21, J27, J28E, N1-4, N5-6, and X5) to enhance the genetic diversity and population stability of San Diego fairy shrimp.

* Refer to TWP 2 Attachment A for details on complexes occupied by focal species (column 1), and Appendix F of the USFWS Recovery Plan for complexes identified as necessary to stabilize the focal species populations (column 2).